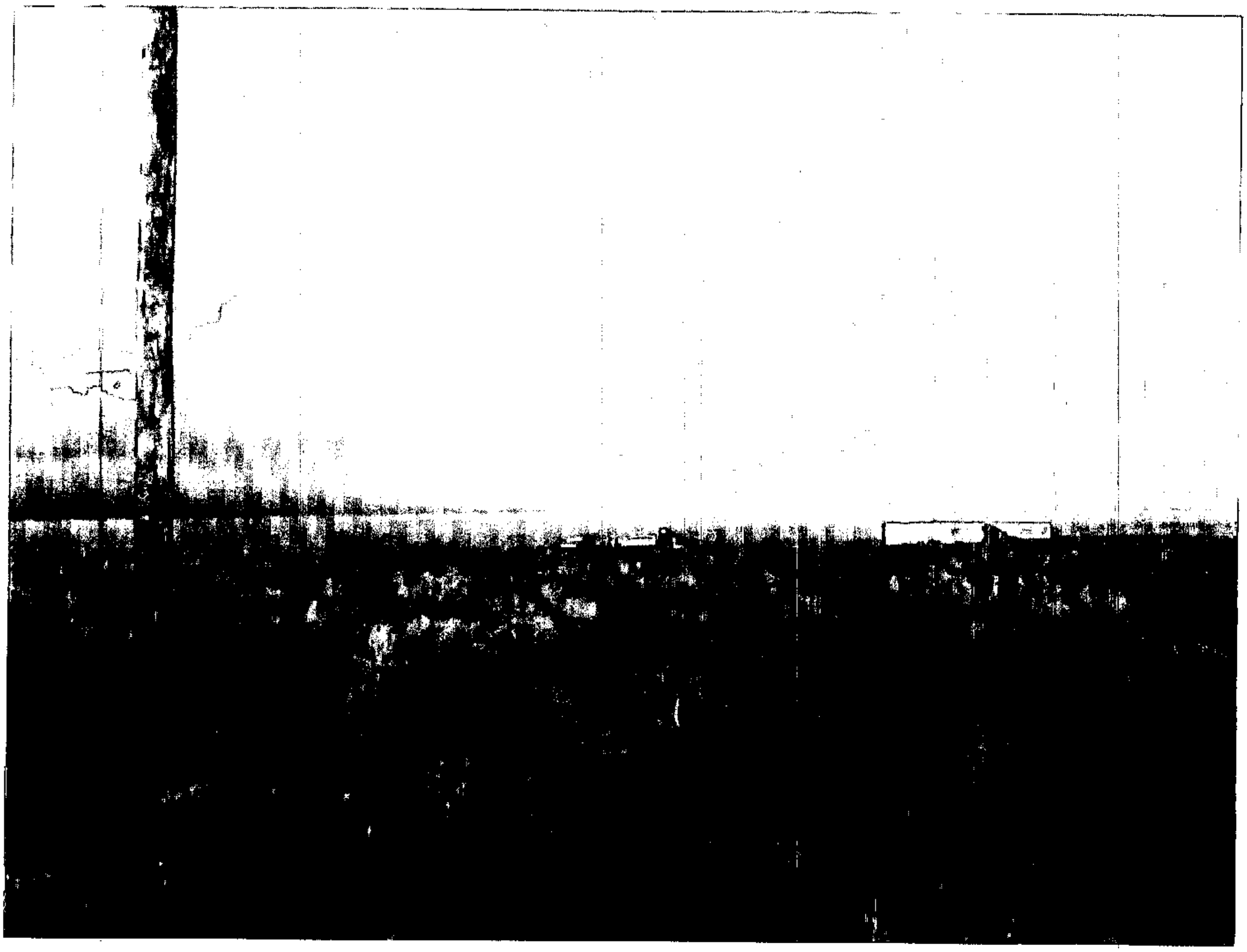
TORRES MARTINEZ DESERT CAHUILLA INDIAN RESERVAITON

COMMENTS TO



DRAFT
PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT FOR THE SALTON SEA ECOSYSTEM RESTORATION PROGRAM

January 12, 2007

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THE TORRES MARTINEZ DESERT CAHUILLA INDIANS
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TORRES MARTINEZ DESERT CAHUILLA INDIANS
MAU - WAL - MAH
SU-KUTT MENYIL

January 11, 2007

Dale Hoffman-Floerke
Salton Sea PEIR Comments
Department of Waqter Resources
Colorado River & Salton Sea Office
1416 9th Street, Room 1148-6
Sacramento, CA 95814

RE: PIER Comments

Dear Ms. Hoffman-Floerke

The Torres Martinez Desert Cahuilla Indians (TMDCI) is submitting the following comments to the DRAFT Programmatic Environmental Impact Report for the Salton Sea Ecosystem Restoration Program.

The TMDCI reservation is one of the three largest land holders of the Salton Sea. The property is located on the eastern end of Southern California's Coachella Valley. The reservation land base encompasses 24,000 non-contiguous acres, of which 11,000 is under water known as the Salton Sea. The land base is triangular in shape which begins at the northwestern point of Ave 62 and Monroe and continues east for 14 miles and ends at the corner of Section 2 of T. 7S, R9E in Riverside County. The land base then descends 18 miles south into Imperial County.

The TMDCI on or around January 27, 2004 was added as an addendum to the Joint Powers Agreement creating the Salton Sea Authority to exercise the common power of directing and coordinating actions relating to improvement of water quality and stabilization of water elevation and to enhance recreational, economic development potential, and other beneficial uses of the Salton Sea.

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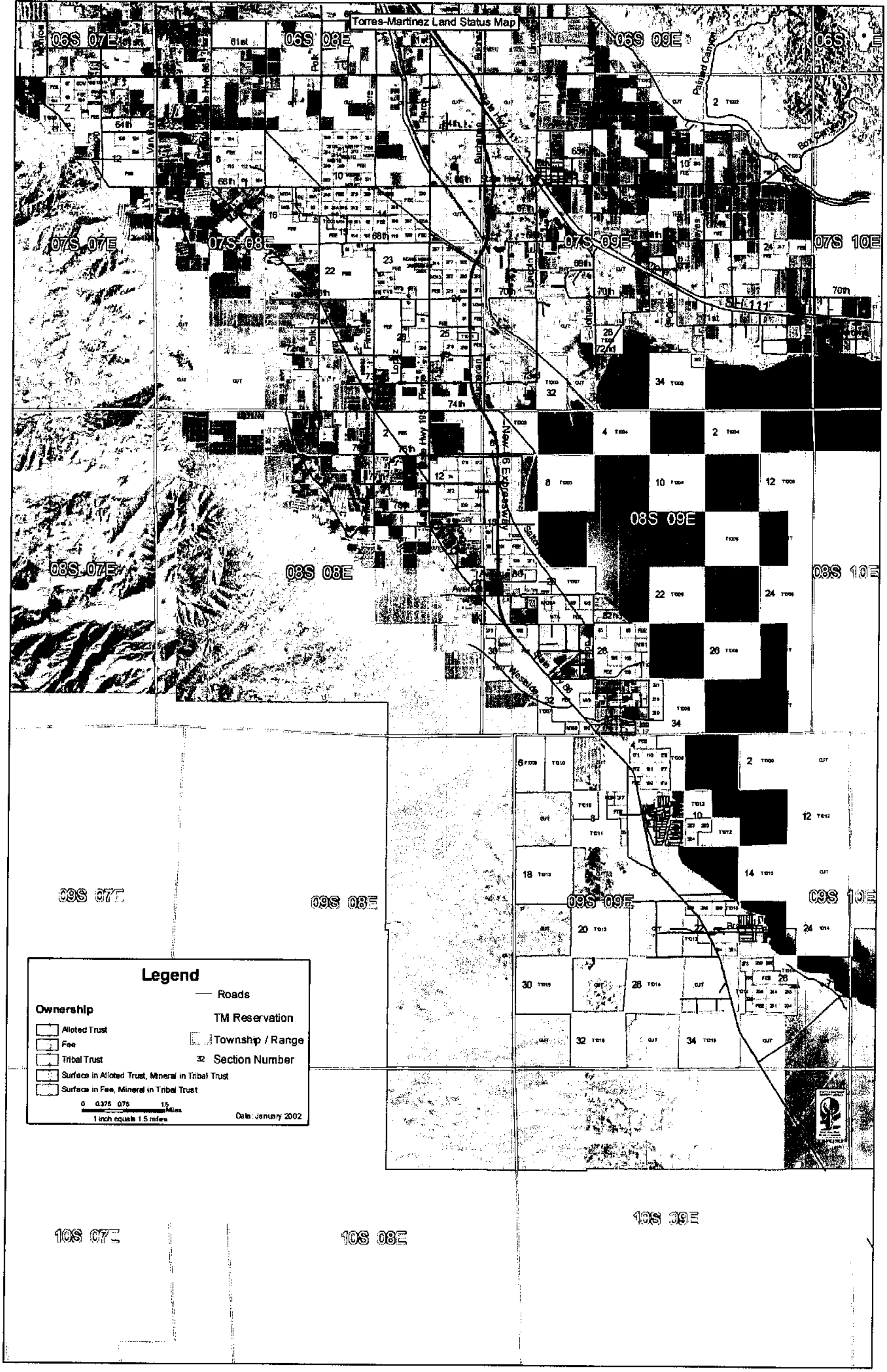
The TMDCI General Membership at a duly called meeting endorsed the Salton Sea Authorities plan. The Tribe is presenting the following comments for the record.

If you have any questions, please contact Joe Loya, Tribal Resource Manager at (760) 397 - 0300 ext 139.

Sincerely,

Raymond Torres

Raymond Torres, Chairman
Torres Martinez Desert Cahuilla Indians


Torres-Martinez Land Status Map
06S 07E
06S 08E
06S 09E
07S 07E
07S 08E
07S 09E
07S 10E
08S 07E
08S 08E
08S 09E
08S 10E
09S 07E
09S 08E
09S 09E
09S 10E
10S 07E
10S 08E
10S 09E
Legend
Roads
TM Reservation
Township / Range
Section Number
Ownership
Alloted Trust
Fee
Tribal Trust
Surface in Alloted Trust, Mineral in Tribal Trust
Surface in Fee, Mineral in Tribal Trust
0 0.375 0.75 1.5 Miles
1 inch equals 1.5 miles
Date: January 2002

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Salton Sea Authority Comments on the Salton Sea Ecosystem Restoration Program PEIR

G-1. Socioeconomics, Impacts on Children, Environmental Justice. While CEQA does not require consideration of socioeconomic impacts, impacts on children, or environmental justice (EJ) issues, such issues would be addressed in any later programmatic or project-specific EIS/EIR (as NEPA does require such analysis) and would be a part of the decision making process in choosing a preferred alternative under NEPA. Given the likely importance of these issues later in the process, the SSA is concerned that not considering these issues at this time may result in the Secretary of Resources selecting an alternative that disproportionately affects children and underprivileged communities surrounding the Sea. The SSA strongly encourages DWR to bring to the Secretary's attention, issues of socioeconomics, impacts on children and environmental justice for him or her to consider in his or her selection of a preferred alternative. This is doubly encouraged given that the PEIR does include financial estimates of the direct costs of each alternative; it should also therefore allow for indirect impacts on the local economy and population.

In particular, the PEIR--or the decision-making process--should consider EJ. Many of the communities surrounding the Salton Sea are or contain low-income or minority populations (African-American, Native American, and Hispanic), which are particularly called out under EO 12898, Environmental Justice, for analysis of disproportionate environmental impacts on those communities. Environmental Justice analysis would include identifying census tracts or broader geographic areas with substantial proportions of low-income or minority residents, then determining whether any of the direct or indirect impacts of the project might affect those communities to a greater effect than they would non-EJ communities.

Direct or indirect impacts that could affect EJ communities in the project area could include:

- Access to recreational resources, particularly shoreline activities, as the shoreline of the Sea changes in various ways under the proposed alternatives;
- Indirect economic impacts from loss of business/employment associated with changes in recreational uses along the Sea;
- Indirect economic impacts associated with changes in agricultural practices in the Imperial Valley resulting from changes in water distribution that might result from implementation of the project, thus leading to job losses or other economic changes;
- Indirect environmental impacts associated with deterioration of air quality including increased odors; and
- Loss of tax-based funding for community services as a result of lost business in the recreational, agricultural, or other sectors along the Sea, and losses in property values in the Salton Sea basin. An analysis of how each alternative would affect property values in the Salton Sea basin should be conducted and considered in the Secretary's decision.

G-2. Economic Effects. The PEIR contains no data on economic impacts that allow for a comparison of the alternatives. The only analysis is a qualitative analysis, and it is cursory at best. A full economic analysis should be conducted and include:

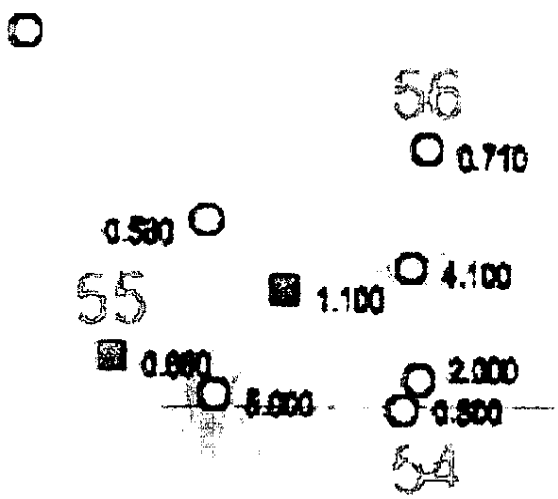
- Value of recreation use from fees, gas, food, lodging, and goods. Also include estimated value of recreation along the flyway from migratory species. Recreation used should include hunting, fishing, camping, bird watching, hiking, and OHV use.
- Income generated from associated retail sales.
- Income generated from construction of projects (jobs and supplies)
- Income generated from operation of the project (jobs and supplies)
- Income generated from increased home construction (jobs and supplies)
- Income generated from service jobs and businesses associated with increased residential

- Income from increased taxes due to homes and businesses

For example it is expected that the improved conditions at the Salton Sea as a result of the SSA Plan (Alternative 7) would result in the construction of an estimated 100,000 homes. The estimated taxes generated by 1,000 homes is $2.8 million annually (Del Rio Advisors Memo, November 6, 2006). If 2,000 homes were constructed over the 50-yr life of the project (equal to 100,000 homes) the taxes generated during that 50-yr period would be $7.3 billion at today's dollars.

The Secretary of Resources should be presented with the results of such socioeconomic analyses in his or her decision-making process; otherwise, the Secretary may unknowingly choose a preferred alternative that does not maximize the potential socioeconomic benefits available under other alternatives.

G-3. Selenium Levels at the Saline Habitat Complex (SHC) Proposed for the North Sea. Alternative 7 includes a 1,600-acre SHC at the mouth of the Whitewater River. Concerns have been expressed by the California Department of Fish and Game regarding high selenium levels in the sediments at this location, and that sediment-bound selenium would become salinated and thus bioavailable to benthic organisms, allowing selenium an entry-route into the food chain. A close examination of the selenium levels found within this proposed area show that only one sample location exists within this area, showing selenium levels from 0-15 cm depth to be 0.580 mg/kg dry weight. This selenium level is within the range of levels found in the south end of the sea, in areas proposed for SHC in other alternatives. For example, Alternatives 1, 2, 4, 5, and 6 include SHC or SHC-like lakes over one sample location with a selenium result as high as 0.870 mg/kg dry weight. The selenium data map shows that local variations are substantial, with selenium levels of greater than 4.100 mg/kg showing up only one mile away from selenium levels of 0.710 (in the north sea, to the east of the proposed SHC). The SSA feels that without additional testing of the Whitewater delta area, that ruling out this area for a SHC is not justified by the limited and unreliable data available.



G-4. Water Temperature Impacts of Eliminating Deep Waters. A flaw in the PEIR results in favoring alternatives that offer more shallow water habitat over marine habitat. The flaw lies in the fact that although modeling was performed for several water quality parameters, there was no conclusion drawn about the effects of increasing the surface to volume ratio on water temperature. Alternatives that propose to create large areas of shallow habitat (<20' depth) will greatly increase the area exposed to solar radiation compared to the volume of water available to absorb that radiation. The inevitable result of this process will be greatly increased temperatures in constructed cells. Avian botulism, which has caused massive dieoffs of migratory birds at Salton Sea in the past, incubates best at higher water temperatures, and is spread most effectively in areas where birds are crowded together. It appears that both of these conditions would be most likely under Alternatives 1, 2, and 4, and least likely under Alternative 7, which proposes the greatest extent of deep marine sea and therefore the lowest surface to volume ratio. Offering the greatest extent of deep marine sea also allows species such as pelicans and grebes to spread out into lower concentrations, thereby lowering the risk of spread of avian botulism compared to alternatives that stress higher SHC.

G-5. Decreased Dissolved Oxygen Levels and Decreased Productivity in Shallow Waters. In the water quality section of the PEIR, it is stated that increased water temperature is associated with lower levels of dissolved oxygen (DO). Lower levels of DO lead to decreased productivity throughout the water column. Since it appears that temperatures are most likely to be higher in the SHCs than in the marine sea areas, it is likely that the lowest levels of DO would occur there. Although some deeper habitat would be created by excavating large holes in the SHCs, these do not appear to be extensive enough to offset temperature increases that would occur as a result of increasing the surface to volume ratio. Alternatives that offer greater amounts of marine sea would be less subject to warming effects, thus less susceptible to reduced DO levels associated with warming effects. Alternative 7 would be the least susceptible to decreased DO levels and productivity due to warming effects.

G-6. Inadequacy of Deep Holes in SHC for Fish Refugia. The proposal to provide fish refugia and habitat diversity by excavating deeper holes in the SHCs is flawed. Even if such holes were large enough to absorb fish populations without overcrowding, it is unlikely that such excavated areas would offer the complexity or structural diversity that would be required to support fish populations throughout all phases of their lifecycle, and therefore, they would be unable to sustain fish populations in the long-term. Such habitat already exists or would exist under alternatives that offer substantial marine sea habitat, of which Alternative 7 would offer the most.

G-7. Concerns Regarding Air Quality Impacts of Mid-Sea Barrier. Concerns have been expressed regarding the air quality impacts (dust and diesel exhaust) related to the transportation of the large amounts of rock and gravel needed to construct a mid-Sea barrier. The SSA Plan mitigates most of these impacts by the proposed construction and use of a conveyor system that could incorporate an electric train. Since the rock would be transported from a higher elevation to a lower elevation, electrical generators could be incorporated into the train's braking system, allowing for energy to be captured as the train descends to the Sea. The return of the empty railcars could then be powered by this stored energy, essentially eliminating any emissions related to the transport of the rock to the Sea.

G-8. Concerns Regarding Impacts to Desert Tortoise and Big Horn Sheep Habitat from Mining Related to Mid-Sea Barrier. It is unknown at this time whether the potential mining sources for the mid-Sea barrier would be within habitat for the Big Horn Sheep (Coolidge Mountain area) or the Desert Tortoise (Eagle Mountain area). Biological surveys would be conducted at the project level environmental analysis, and if habitat is found in the chosen mining location, mitigation would be incorporated in consultation with USFWS and CDFG. It is common for projects to occur within habitats for these species with appropriate mitigation.

G-9. Concerns Regarding Flexibility of the SSA Plan. Concerns have been expressed regarding the inflexibility of the mid-Sea barrier once it is constructed. The SSA Plan incorporates other flexibilities to accommodate changes in water inflows such as the ability to change the water level of the Recreational Saltwater Lake, the Recreational Estuary Lake, and to prioritize river inflows to the SHC as needed.

The hydrodynamic and water quality model currently under development will provide additional insight related to this question. The model is capable of simulation the pseudo load of bed materials, sediments, organics and contaminate into the water column due to construction activity. Since the model will be capable of simulation on multi-year time scales, the transport and fate of theses materials and there impact on water quality could be determined.

G-15. Concerns Regarding Finding a Contractor with Sufficient Capacity to Construct the SSA Plan. For projects of this magnitude, the construction is typically broken up into multiple bid packages. This is to allow construction to get started early on some of the items that require less design time, as well as to allow multiple contractors with sufficient bonding capacity to prepare competitive bids. With the multiple packages, there should be sufficient construction firms that could handle the packages. This approach was used for the Diamond Valley Reservoir project which required placement of more than 100 million cubic yards of material, more than the Authority's current estimate of about 65 million cubic yards for the Salton Sea project.

G-16. Concerns Regarding the SSA Plan's Ability to Function with Variable Flows. The hydrodynamic and water quality model will provide a tool for evaluating the impacts for future inflow condition. Model results using the Salton Sea Accounting model suggest that typical annual fluctuations in inflow will result in seasonal variations of the lake level of about one foot within the lake. The Authority does not believe that long term inflow projections under 640,000 acre-feet/year are reasonable given the current water rights in the Imperial Valley.

G-17. Concerns Regarding How Higher than Average Inflows Would Affect the Stability of the Salt Crust Alongside the Brine Pool. Crystallized salt deposits will dissolve only if in contact with water that is not yet saturated with dissolve salts. The brine pool will be at saturation, so increasing the inflow to the brine pool will merely transport saturated or nearly saturated brine to the surrounding salt deposits. Higher than average inflows to the brine pool would simply result in additional salt crystallization as the added brine evaporates.

Annual flooding of the Bonneville Salt Flats from desert storms does not remove the permanent salt crust. In fact, such annual flooding helps maintain the integrity of the salt flat by dissolving and then re-depositing cemented halite at the salt flat surface. Precipitation inputs simply help maintain the moisture content of the saline sediments underneath the salt deposits, allowing natural evaporation processes to maintain the salt crust.

Even when wet, the permanent salt crust at Bonneville Salt Flats has considerable structural strength. Test conducted at Bonneville Salt Flats showed that even when saturated, the main portion of the Bonneville Salt Flats can support travel by 33-ton tractor-trailer rigs without appreciable rutting.

Brine application to an established halite salt crust serves primarily to add more salt to the system, either as part of the salt crust itself or in the saturated brine found in sediments under the salt crust. This has been demonstrated at Bonneville Salt Flats. Brine extracted from the playa sediments under the Bonneville Salt Flats has been used for commercial potash production for many decades. Studies conducted between 1960 and 1988 showed that this brine extraction had reduced of the original salt flat acreage and salt flat thickness. The Bureau of Land Management conducted a 5-year test program from 1997 to 2002 to help restore the salt deposits. This test program demonstrated that halite precipitated in concentration ponds during the potash production process could be re-dissolved and returned to the salt flats. The amount of salt returned to the Bonneville Salt Flat system during the 5-year test program (an average of 1.2 million tons per year) exceeded the amount removed in brine pumped from the playa sediments for potash production (an average of 0.85 million tons per year). The replenishment program operated from November through April of each fiscal year. Approximately 19,192 acre-feet (6.3 billion gallons) of brine were delivered to the salt flats during the 5-year replenishment program (15,857 hours of pumping). In addition to increasing the thickness of the existing salt crust, the *surface area would be smaller and the salinity would be higher than projected in the definition of this alternative."*

PS-2. Page ES-20, paragraph 4
The last sentence describes unique features of Alternative 7. It may also be noted here (if space is available on the page) that Alternative 7 is the only alternative that maintains an open-water waterfront at Salton City, and 1 of only 3 alternatives (5, 6, and 7) that maintains open-water waterfront at Desert Shores. This has a huge impact for the development potential in these communities. I suggest adding the following text to the last sentence, "...and continued open water at Salton City and Desert Shores."

PS-3. ES-20, summary box
Were the Final PEIR to reflect the revised SSA Plan, the SHC should be changed from 12,000 to 17,800 to reflect the revised SSA Plan to include 16,000 acres in the south sea and 1,800 acres in the north sea.

PS-4. ES-20, summary box
Were the Final PEIR to reflect the revised SSA Plan, 104,000 should be changed to 90,000 and the following text should be removed *"if inflows are 717,000 acre-feet/year"*.

PS-5. ES-20, summary box
Were the Final PEIR to reflect the revised SSA Plan, the sentence starting with *"If inflows are 800,000...."* should be removed.

PS-6. ES-20, summary box
Were the Final PEIR to reflect the revised SSA Plan, brink sink acreage should be changed from 15,000 acres to 60,000 acres.

PS-7. Page 3-75, paragraph 1
Revise paragraph to state *"A preliminary version of Alternative 7 was defined by the Salton Sea Authority in spring of 2006. Since that time, the Authority developed a comprehensive plan in July 2006, and further refined approaches to Air Quality Mitigation and Salton Management in September 2006 and Ecological Features and Selenium Management in October 2006. These plans as provided by the Salton Sea Authority are included in Appendix I."*

PS-8. Page 3-75, paragraph 2
Insert "and less saline" between the words "shallower" and "Recreational".

PS-9. Page 3-75, paragraph 2
To accurately reflect the northern SHC proposed in Alternative 7, revise end of first sentence to read *"..and two Saline Habitat Complexes located along the southwestern shoreline and at the mouth of the Whitewater River along the northern shoreline."*

PS-10. Page 3-75, paragraph 3
Were the Final PEIR to reflect the revised SSA Plan, *"near mid-Sea"* should be changed to *"just north of mid-Sea"*

PS-11. Page 3-75, paragraph 4
Were the Final PEIR to reflect the revised SSA Plan, 800,000 should be changed to 717,000 in both places in this paragraph SSA Plan's movement of the sea wall to accommodate the original salinity goals despite a reduced inflow.

PS-12. Page 3-75, paragraph 5
Were the Final PEIR to reflect the revised SSA Plan, the entire paragraph related to inflows of 800,000 acre-feet/year should be deleted. The SSA Plan has been revised to reflect the 717,000 acre-feet/year inflow rate.

PS-13. Page 3-75, paragraph 6
Were the Final PEIR to reflect the revised SSA Plan, at the end of the 2nd sentence, after "*Recreational Estuary Lake,*" the following text should be inserted "*or, with approval of regulatory agencies, directly into the Saline Habitat Complex*".

PS-14. Page 3-75, paragraph 6
Were the Final PEIR to reflect the revised SSA Plan, the description of SHC under Alternative 7 should be revised to reflect that the SHC will receive priority for water use, alleviating the concern expressed regarding the potential of this habitat drying up.

PS-15. Page 5-54, paragraph 6
Were the Final PEIR to reflect the revised SSA Plan, "*Exposed Playa without Air Quality Management*" should be changed to "*Exposed Playa with Air Quality Management*" to reflect updates to the SSA Plan to include all air quality management measures from the Toolbox.

PS-16. Page 6-30, Table 6-5
Were the Final PEIR to reflect the revised SSA Plan, the text in the paragraph in the Comments column, 3rd sentence should be changed in the following way: change "*greater than 40,000*" to "*maintained at 35,000*" to reflect the changes in the SSA Plan to move the mid-Sea barrier to meet water quality objectives at the reduced flow rates.

PS-17. Page 6-35, paragraph 8
Were the Final PEIR to reflect the revised SSA Plan, see first paragraph under Alternative 7. Change "*Exposed Playa without Air Quality Management*" to "*Exposed Playa with Air Quality Management*" to reflect updates to the SSA Plan to include all air quality management measures from the Toolbox.

PS-18. Page 7-12, paragraph 5
Were the Final PEIR to reflect the revised SSA Plan, see first paragraph under Alternative 7. Change "*Exposed Playa without Air Quality Management*" to "*Exposed Playa with Air Quality Management*" to reflect updates to the SSA Plan to include all air quality management measures from the Toolbox.

PS-19. Page 8-24, Table 8-4
Were the Final PEIR to reflect the revised SSA Plan, the use of river water inflows for the SHC and the resultant reduced salinity would result in the following changes to Table 8-4: (1) On page 8-27, that "*Constructed Saline Habitat Complex would support tilapia and other forage fish.*" This statement should be expanded to include support of invertebrates, as is shown for other alternatives. (2) On page 8-34, that "*...the salinity of the Recreational Saltwater Lake and Saline Habitat Complex would be higher and might not support fish during Phase II.*" This statement should be revised to remove reference to the SHC.

PS-20. Page 8-66, paragraph 1
Were the Final PEIR to reflect the revised SSA Plan, see first paragraph under Alternative 7. Change "*Exposed Playa without Air Quality Management*" to "*Exposed Playa with Air Quality Management*" to reflect updates to the SSA Plan to include all air quality management measures from the Toolbox.

PS-21. Page 8-66, Table 8-21
Were the Final PEIR to reflect the revised SSA Plan, see row: "Saline Habitat Complex", and Column: "End of Phase II". Change 12,000 acres to 17,800 acres, and 6,000 acres to 8,900 acres.

PS-22. Page 8-66, Table 8-21

Were the Final PEIR to reflect the revised SSA Plan, see row: "Recreational Saltwater"...717,000... Since the Recreational Saltwater Lake would have a different salinity than the Recreational Estuary Lake, these features should be two separate rows within Table 8-21. For the Recreational Saltwater Lake, change 104,000 acres to 90,000 acres. Add separate row for the Recreational Estuary Lake, indicating that it would be 26,000 acres.

PS-23. Page 8-66, Table 8-21
Were the Final PEIR to reflect the revised SSA Plan, remove 3rd row on table regarding flow rates of 800,000 AFY.

PS-24. Page 8-66, Table 8-21
Were the Final PEIR to reflect the revised SSA Plan, see row "Brine Sink"... Remove reference to 717,000, since that is the new assumption for the SSA Plan.

PS-25. Page 8-66, Table 8-21
Were the Final PEIR to reflect the revised SSA Plan, see row "Maximum Exposed"... Remove reference to 717,000, since that is the new assumption for the SSA Plan.

PS-26. Page 8-66, Table 8-21
Were the Final PEIR to reflect the revised SSA Plan, change footnote "a" from 1,200 to 1,800.

PS-27. Page 8-66, paragraph 2
Were the Final PEIR to reflect the revised SSA Plan, the 3rd sentence should be revised to reflect that the revised SSA Plan includes the option to supply the southern Saline Habitat Complex water directly from the Alamo River, meaning that the complex would have salinity levels suitable for all fish starting in Phase I and continuing throughout project development.

PS-28. Page 8-66, paragraph 2
Were the Final PEIR to reflect the revised SSA Plan, see 5th sentence, and change "unless" to "until", since the target salinity for the Recreational Saltwater lake is 35,000 mg/L.

PS-29. Page 8-67, Table 8-22
Were the Final PEIR to reflect the revised SSA Plan, the calculations supporting the values in this table should be revised based upon the updates to the SSA Plan, which now includes nearly 50% more Saline Habitat Complex acreage, and less open water.

The air quality impact analysis for Alternative 7 is erroneous and results in higher calculated emissions than would result had the salt crust mitigation been included in the analysis. Moreover, the air quality analysis needs to be updated to include the incorporation of air quality mitigation measures from the tool box. The analysis should be revised to use the assumptions stated on page 10-29, which assume 30 percent of the Exposed Playa as being non-emissive, 50 percent as being controlled by Air Quality Management measures, such as water efficient vegetation, and 20 percent being controlled by other Air Quality Management methods, which in this case would be the application of brine to form a Protective Salt Crust.

The Authority anticipates the control efficiency of the Protective Salt Crust to be similar to that of the Protective Salt Flat (also referred to as the Salt Sink or Brine Sink in the PEIR); therefore, the Authority requests that the revised analysis consider this 20 percent area to have an emission control efficiency of 85 percent. Support for the efficacy of a Protective Salt Crust is provided in the Authority's Air Quality Mitigation and Salt Management report.

PS-30. Page 10-84
Construction impacts. The October 2006 PEIR assumes that the Authority Plan involves the use of trucks to transport rock and gravel from the source of said material, to the sea, for construction of the in-sea Barriers (see page 10-80). Air emission calculations assumed that trucks would be carrying this material along a distance of 10-miles, one way. Since March 2006, the Authority

Plan has been developed to include installation of a 2-mile long conveyor system that would move rock from the quarry at Coolidge Mountain, to the sea, where the materials would then be transported by barge to the appropriate in-Sea location and dropped. The Coolidge Mountain site is located in unincorporated Imperial County on tribal (Torres Martinez) land and private property. The conveyor system would involve a mine-car rail that would move the rock and gravel from the quarry to a barge loading pier south of Salton Sea Beach. The use of the conveyor system would drastically reduce the levels of fugitive dust and diesel exhaust generated compared to the use of off highway trucks.

PS-31. Page 13-15, paragraph 7
Were the Final PEIR to reflect the revised SSA Plan, see 1st sentence, and change "*up to 104,000*" to "*115,000*", and delete "*if average inflows are 800,000 acre-feet/year.*"

PS-32. Page 13-15, paragraph 7
Were the Final PEIR to reflect the revised SSA Plan, see 2nd sentence, change 12,000 to 16,000 and 1,200 to 1,800.

PS-33. Page 13-15, paragraph 7
4th sentence, insert the following at the beginning of the sentence: "*Except for the Brine Sink,*" since the Brink Sink would not provide recreational opportunities.

PS-34. Page 13-15, paragraph 10
Delete this paragraph and replace with "*Tilapia and marine sport fish species could be established in both the Recreational Saltwater and Estuary Lakes since salinity levels would be below 40,000 mg/L. Therefore, angling opportunities would be the same as Existing Conditions and the No Action Alternative, and sport fishing opportunities would be better than Existing Conditions and the No Action Alternative.*"

PS-35. Page 13-16, paragraph 2
Delete 2nd paragraph. This text would be replaced with the text suggested in the previous comment regarding the deletion of paragraph 10 on page 13-15.

PS-36. Page 18-47, paragraph 10
Delete text after "...would be similar to those described under Alternative 5," to reflect revision of the SSA Plan to include all air quality management techniques in the Toolbox.

PS-37. Page 22-13, paragraph 1
This paragraph/sentence does not make sense. Please reword.

Air Quality and Salt Crust Comments

AQ-1 - Chapter 10 and Attachments E1, E2, Construction Emissions
The use of common assumptions for comparing alternatives is reasonable only when those assumptions are reasonable for each of the alternatives being compared. When the scale and nature or construction activities varies substantially among alternatives, it is not reasonable to assume identical construction methods for each alternative. Alternatives 3, 5, 6, 7, and 8 include construction of major barriers in or across Salton Sea. It is unreasonable to assume that construction techniques and equipment for those barriers would be the same as those used for small berms.

AQ-2 - Chapter 10 and Attachments E1, E2, Construction Emissions
Appendices H-5 and H-6 discuss the use of mine-haul trucks, rail systems, electric conveyor systems, and electric mine car systems for transporting rock and gravel fill material to construction sites at the Salton Sea, and categorizes these transport methods as "the most viable options for quarry sites near the Salton Sea". Yet these methods of material transport are not

discussed in the PEIR text, and are not considered in the PEIR air quality analyses, even though Appendix H-6 says they are probably the most viable transport methods for alternatives requiring large-scale transport of rock and gravel.

AQ-3 Chapter 10 and Attachments E1, E2, Construction Emissions
APCD fugitive dust control requirements and Clean Air Act conformity requirements will force agencies to adopt construction techniques that minimize equipment emissions and fugitive dust emissions. The PEIR needs to base its comparison of alternatives on such construction methods, especially since Appendices H-5 and H-6 imply that material transport methods other than highway trucks are not only feasible but probably the most economical. Using an artificial and unreasonable assumption about construction methods (particularly the assumption that all rock and gravel would be transported in 20-ton highway trucks) results in an artificial and unreasonable comparison of alternatives that defeats the basic purpose of using the PEIR to select a preferred alternative.

AQ-4 Chapters 3 and 10, Executive Summary, Appendix H-7, Construction Methods
Chapters 3 and 10 need to address differences in construction methods that are probable for major features of the different alternatives. In particular, methods for transporting large quantities of rock and gravel need to be discussed, recognizing the transport methods noted in Appendices H-5 and H-6. None of the maps in the PEIR text show the location of existing rail lines, even though rail transport of rock and gravel is clearly a potential material transport method. The text should reference Figure H5-2 in Appendix H-5, which shows existing rail lines and potential quarry areas near Salton Sea.

AQ-5 Text and Attachment E9, Salt Crust formation mechanisms
Before comparisons can be made between Salton Sea and other locations concerning the potential for salt deposit formation and subsequent air quality problems, there must be reasonable evidence that the basic hydrologic mechanisms for salt deposit formation are similar. The mechanism of formation has an important influence on the potential amount and spatial distribution of any salt deposits that form. Those factors, in combination with considerations of salt chemistry and mineralogy, control the extent to which salt deposits play a role in development of air quality problems. The PEIR does not provide any evidence that salt formation mechanisms at Salton Sea will be similar to those that produced the Owens Lake dust storm problem.

Supplemental Discussion, Comment AQ-5
Five general hydrologic mechanisms for salt deposit development are easily identified:

A. Evaporation of saline water from the wetted zone around the shore of a saline water body (wetted zone produced by wave run-up or rapid lake level fluctuations). This is a universal mechanism at saline lakes, but it is not capable of forming geographically extensive salt deposits.
B. Evaporation from sediments wetted by saline surface water flows (direct discharge from saline springs or percolation of streamflow when the stream is fed by saline springs or discharging saline groundwater). Unlikely to create geographically extensive salt deposits.
C. Evaporation from very shallow saline groundwater or surfacing saline groundwater zone exposed by changing lake levels. This is the dominant mechanism for salt deposit formation at Mono Lake, where declining lake levels exposed a zone of previously subsurface saline groundwater inflow.
D. Salt pan deposited on a lakebed from salt-saturated lake waters, with the salt deposits then exposed to air by falling water levels. This was the primary mechanism for the original salt deposits formed as Owens Lake desiccated. Those original salt deposits have subsequently been re-worked by precipitation and surface water inflow events (see mechanism E).
E. Salt pan deposited by desiccating lake dissolved by precipitation or surface water inflows, with dissolved salts then percolating into lakebed sediments to augment a saline groundwater body or to leave salt-impregnated sediments. Subsequent

seasonal salt deposit formation when precipitation, surface water inflows, or groundwater inflows bring saline water close enough to the ground surface to allow capillary action and surface evaporation with resulting salt deposition on the ground surface. Probably the major current mechanism operating at Owens Lake. But this mechanism does not exist without the initial desiccation of the lake to create salt deposits on an exposed playa (mechanism D) that can then charge the system with a significant salt load.
(See supplemental material for Comment AQ-116 regarding issues of salt chemistry, included in Exhibit X.)

AQ-6 Text and Attachment E9, Salt Crust formation mechanisms
The water balance model for the Salton Sea summarized in Chapter 5 shows only 11,000 acre-ft per year of groundwater inflow, compared to 49,141 acre-ft per year of direct precipitation input. This indicates that declining water levels at the Salton Sea are unlikely to expose any significant zones of saline groundwater inflow (the Mono Lake salt deposit formation mechanism). (See supplemental discussion for Comment 4 and Comment 116)

AQ-7 Text and Attachment E9, Salt Crust formation mechanisms
The PEIR fails to provide a salt balance timeline for the major water bodies associated with the different project alternatives. The only information provided is an estimate of overall salinity levels. Thus, it is somewhat uncertain when directly precipitated salt deposits (the mechanism for initial salt deposit formation at Owens Lake) might form at Salton Sea under the various alternatives, or what portion of those deposits might be exposed by projected further declines in water levels. (See supplemental discussion for Comment 4 and Comment 116)

AQ-8 Text and Appendices , Salt balance and salt crust formation mechanisms
Chapter 6 of the PEIR notes that calcite and gypsum seem to be precipitating from the Salton Sea. Calcite and gypsum precipitation remove dissolved calcium from the lake water, and gypsum precipitation also removes dissolved sulfate. The PEIR provides an estimate of overall salinity levels in the brine sink, but does not provide any more detailed salt balance information concerning future conditions at the Salton Sea. For most of the aquatic habitat features of the alternatives, predicted salinity levels indicate that sodium salts in the Salton Sea will not reach saturation, and thus will not precipitate on exposed lakebed sediments as water levels decline. Instead, dissolved salts will simply drain through exposed sediments back into the lake as the groundwater table adjusts to changing water levels in the Salton Sea. Only the brine sink features are predicted to have salinity levels consistent with salt saturation conditions. Thus, the mechanism for initial salt deposit formation at Owens Lake will only exist in the brine sink areas. (See supplemental discussion for Comment 4 and Comment 116)

AQ-9 Chapter 6, Water Quality data for surface water inflows
The PEIR fails to provide mineral water quality data for the major streams feeding the Salton Sea. This prevents analysis of whether evaporative salt deposit formation along the shoreline of the southern part of Salton Sea may be due to sulfate levels in the discharge from the Alamo River, New River, agricultural drains, or San Felipe Creek that are higher than the average sulfate level for lake water.

AQ-10 Chapter 6, Salton Sea salt balance
The PEIR and its appendices fail to provide a timeline of changing salinity and salt balance conditions for the No Action Alternative and the various water bodies associated with project alternatives. Such data are essential for determining when the different major salts in the Salton Sea will reach saturation and begin precipitating to form a salt bed that might be exposed by further declines in water levels. A proper analysis of air quality impacts, even at a programmatic level, requires such information.

AQ-11 Chapter 10 and Appendix E, Emission potential of salt deposits

The PEIR needs to distinguish between barren sediments that would be exposed under the various alternatives and areas where deposition of salts from saturated brines may occur and subsequently be exposed by further predicted declines in water levels. For areas where salt deposition from saturated brines may occur, the PEIR needs to evaluate the expected chemistry of the resulting salt deposits in order to determine whether those deposits are a potential source of emissions or would be an effective cap protecting underlying sediments from wind erosion. This is a generic issue that requires analysis at a programmatic level. (See supplemental discussion for Comment 116)

AQ-12 Text and Attachment E9, Salt Crust formation mechanisms
The only hydrologic mechanism for salt deposit formation at the Salton Sea that has been implied in the PEIR is evaporation of saline water from a wetted shoreline zone. The DRI study found only one salt deposit at a location more than 1 meter above lake level. All other salt deposit locations were in the immediate shoreline area. If evaporation from recently wetted shoreline sediments is the primary mechanism for formation of efflorescent sulfate salts, then this seasonal, localized, and spotty distribution of limited salt deposits will move up and down with changing lake levels. This mechanism is incapable of producing the large scale dust storms seen at Owens Lake or Mono Lake. It simply does not affect a large enough geographic area to make the Salton Sea another Owens Lake.

AQ-13 Attachment E9, Salt Crust formation mechanisms
PEIR Attachment E9 appears to use the term "efflorescence" as a synonym for "evaporative salt deposits" rather than as the mineralogical definition meaning salts exhibiting a phase change from a crystalline structure to a non-crystalline amorphous powder. When used in a generic sense as meaning an evaporative deposit, the term efflorescence must not be interpreted as implying a high emission rate. The PEIR also seems to assume that all evaporative salt deposits are efflorescent in a mineralogical sense and therefore will have high emission rates. This simply is not true.

AQ-14 Attachment E9, Emission potential of salt deposits
While PEIR Attachment E9 lists and discusses number of different salt minerals, it fails to distinguish between those salt minerals that can contribute to the development of air quality problems and those that do not contribute to air quality problems. No evidence is presented to demonstrate that gypsum deposits are a frequent source of significant fugitive dust problems. Where and under what conditions have gypsum deposits been linked to significant fugitive dust problems? If gypsum deposits are not a source of fugitive dust problems, then formation of gypsum deposits would either be a potential mitigation measure or would simply not be a concern in terms of effectiveness and feasibility of mitigation measures based on forming and maintaining a halite crust.

AQ-15 Attachment E9, Emission potential of salt deposits
The PEIR provides no evidence that sodium chloride deposits are a source of fugitive dust problems. Where and under what conditions have halite deposits been linked to significant fugitive dust problems? If halite deposits are not a source of fugitive dust problems, then deliberate creation and maintenance of halite crusts is an effective mitigation measure, and even unintentional creation of a halite salt crust would be effective mitigation for at least a temporary period. Where the prevailing conditions provide for either continuous or seasonal salt crust replenishment, even an unintentional halite salt crust can last for very long periods of time.

AQ-16 Attachment E9, Emission potential of salt deposits
If the PEIR assumes that halite and gypsum deposits will be sources of air quality problems, why is it that there are no significant fugitive dust problems associated with the Bonneville Salt Flats in Utah? The Bonneville Salt Flats are composed of alternating layers of halite and gypsum. There are no PM10 non-attainment designations for Tooele and Box Elder Counties, Utah where the Bonneville Salt Flats and other adjacent large salt deposits are located. If the PEIR recognizes that halite and gypsum deposits are not a source of air quality problems, then that needs to be

dropped more than 10 feet since the late 1980s. Because Great Salt Lake is relatively shallow, water level fluctuations result in large changes in lake surface area and shoreline sediment exposure. Salinity levels in Great Salt Lake are much higher than those in Salton Sea (about 13% salinity in the south arm, and about 25% salinity in the north arm). And like Salton Sea, Great Salt Lake is a chloride-dominated system with sulfate as a secondary salt. Sodium sulfate is known to precipitate on the lake bed during cold winter periods. The Great Salt Lake even has a rock-filled causeway across the middle of it (built in the 1950s). (See supplemental Utah DNR and DEQ fact sheets and Great Salt Lake Chemistry sheet, included in Exhibit X)

AQ-18 Text and Attachment E9, Salt Crust formation mechanisms
The only efflorescent salt deposits identified in the vicinity of Salton Sea are those that have been found along the immediate shoreline, especially around the southern half of Salton Sea. But the PEIR fails to provide any evaluation of these seasonal and localized deposits or of the underlying hydrologic mechanisms that produce them. Nor is there any information provided to determine whether the appearance of these deposits is a relatively recent occurrence or is a phenomenon that has existed for a long time.

AQ-19 Attachment E9, Salt Crust formation mechanisms
Anecdotal information provided by Al Kalin (Imperial County Farm Bureau) at the November 7, 2006 Air Quality Working Group meeting suggests that efflorescent salt problems at the south end of Salton Sea have gotten worse in recent years, and that this year is the first time he has seen any evidence of crop damage from saline dust. If the seasonal development of efflorescent salt deposits has in fact become more extensive in recent years, what are the likely causes? It is important to understand the origin and dynamics of the seasonal efflorescent salt deposits at Salton Sea. An understanding of these deposits would help predict future conditions at Salton Sea and would help identify mitigation measures to eliminate or minimize their formation.

AQ-20 Attachment E9, Salt Crust formation mechanisms
The DRI study used to estimate emission rates from exposed sediments included chemical analyses of bulk soil samples. Why didn't that study also include chemical analyses of the salt deposits where portable wind tunnel and PI-SWERL analyses were conducted? The known chemistry of Salton Sea waters and the narrative descriptions of the deposits suggest that they are probably sodium sulfate salts, but without laboratory analyses there is no conclusive evidence that this is so. If the salts turn out to be sodium carbonate salts, then something very unusual is happening at the south end of the Salton Sea. The failure to obtain chemical analyses represents a missed opportunity to rule out unusual and unexpected conditions.

AQ-21 Attachment E9, Salt Crust formation mechanisms
The PEIR needs to provide a basic salt balance analysis for Salton Sea so that data such as Appendix D to Attachment E9 and the attached salt saturation curve sheet (at end of AQ comments) can be used to determine if the current development of evaporative salt deposits along the southern part of Salton Sea is simply the expected result of evaporation of typical Salton Sea waters at low temperatures or represents some other process. A salt balance analysis is also required to determine whether sodium chloride or sodium sulfate is likely to be the first salt to reach saturation and form precipitated deposits as water levels decline and salinity levels in the brine sink increase under the various alternatives. That information is critical to a reasonable analysis at the programmatic level of whether or not areas around the brine sink would be emissive. (See salt saturation curve sheet at the end of these comments)

AQ-22 Attachment E9, Salt Crust formation mechanisms
Is there any general correlation between the development of localized areas of efflorescent salt deposits along the shoreline of Salton Sea and atypical weather conditions? Is there any general correlation between development of localized areas of efflorescent salt deposits along the shoreline of Salton Sea and atypical lake level fluctuations?

AQ-23 Text and Attachment E9, Salt Crust formation mechanisms study. More importantly, because all alternatives include a brine sink, this was a failure to obtain information on emission rates that could be applicable to all alternatives.

AQ-29 Text, Appendix H-3, and Attachment E9, Air Quality Mitigation Measures
Large-scale pumping of highly saline water from the north arm of Great Salt Lake was conducted between April 1987 and June 1989. Over a 26-month period, the West Desert Pumping Project moved 2.7 million acre-feet of highly saline water containing 695 million tons of salt from the Great Salt Lake to the 325,000 acre West Pond (larger than the surface area of the Salton Sea) in the Newfoundland Basin between Great Salt Lake and the Bonneville Salt Flats. Why didn't the PEIR investigate whether the salt deposits produced by evaporation of that water have provided a stable cap on desert soils, or whether those deposits have caused windblown dust problems in the 17 years since the pumping was completed? General information on this project is available at the following website: [illegible]. (See Great Salt Lake Desert sheet for satellite image, included in Exhibit X)

AQ-30 Attachment E9, Emission potential of salt deposits
The PEIR team should contact the Utah Division of Air Quality, EPA Region 8, BLM Salt Lake Field Office, and other relevant land management agencies to determine the nature and extent of any fugitive dust problems that have developed as a result of lowered water levels in the Great Salt Lake. Similarly, these agencies should be contacted to determine if the permanent salt crust at Bonneville Salt Flats is a source of significant fugitive dust problems and whether the West Desert Pumping Project resulted in fugitive dust problems associated with the salt deposit created in the West Pond (Newfoundland Basin). While it is obvious that dust storms can be generated from almost any desert area with exposed soils, the question is whether dust storms have developed from areas exposed by lowered water levels at Great Salt Lake or from permanent chloride salt crusts such as Bonneville Salt Flats or the salt deposits in Newfoundland Basin.

AQ-31 Attachment E9, Emission potential of salt deposits
The Utah Division of Air Quality and the San Francisco Bay Area Air Quality Management District should have first-hand experience with commercial salt evaporation pond systems. These agencies should be contacted for a regulatory agency perspective on whether sodium chloride salt crystallization ponds are a significant source of fugitive dust emissions, and if so, whether that is the result of general wind erosion conditions or is associated with industrial operations.

AQ-32 Attachment E9, Emission potential of disturbed sediments
The DRI study notes that areas disturbed by ATVs and other off-road vehicles were deliberately avoided in the PI-SWERL sampling program. This represents a missed opportunity to collect data on the indirect emissions effect of sediment disturbance from such uses.

AQ-33 Chapter 10 and Attachments E1, E2, E3, Wind Erosion from exposed areas
The Draft PEIR uses preliminary data from the DRI wind tunnel and PI-SWERL study to estimate fugitive dust from areas that will be exposed by lowered water levels at Salton Sea. The PEIR analyses need to be updated using data from the final DRI report.

AQ-34 Attachment E4, Health Risk estimates
Attachment E4 was prepared prior to the drafting of most of the PEIR. Attachment E4 should be revised to reflect a long-term (10-year or 15-year) average of annual average PM10 levels from relevant stations (Indio, Niland, Westmorland, Brawley, and El Centro) rather than the arbitrary assumption of 100 micrograms per cubic meter annual average PM10 exposure over 70 years. The 10-year (1996 - 2005) mean PM10 level for Indio, Niland, Westmorland, Brawley, and El Centro is 44 micrograms per cubic meter. Thus, health risk values computed in Attachment E4 should be reduced by 56%. (See PM10 data sheet, included in Exhibit X)

AQ-35 Text and Appendices, Comparison of Salton Sea to Owens Lake
Appendix H-3 acknowledges (page H3-6) that "Owens Lake emissions are considered to result from an unusual combination of climatic, geochemical, and watershed conditions, a number of

which would not be replicated at Salton Sea." Why the does the PEIR focus exclusively on Owens Lake as a point of comparison? The PEIR should include a comparison to Great Salt Lake and the major salt flats in Utah as an additional point of comparison. Salton Sea falls between Great Salt Lake and Owens Lake in terms of water chemistry, and is more like Great Salt Lake than Owens Lake in many respects. See also Comments 116 and 118.

AQ-36 Text and Appendices, Impact Analyses
The Final PEIR needs to be revised to reflect current designs and assumptions of Alternatives 4 and 7, as well as refinements to other alternatives that may be warranted by public review of the Draft PEIR. Otherwise, the PEIR will fail to meet its basic goal of providing a sound basis for selecting a preferred alternative.

AQ-37 Text and Appendices, Impact Analyses
Given current APCD regulations concerning fugitive dust, the QSA 4-step process, and the adaptive management assumption being made in the PEIR, it seems unreasonable to assume that any large area of exposed lakebed sediments at Salton Sea would be both emissive and uncontrolled under any alternative unless the landowner is exempt from APCD regulation.

AQ-38 Text and Appendices, Impact Analyses
Data for 2002 as presented in Table E3-3 in Attachment E3 shows only 19 hours of wind speed above the wind erosion threshold velocity during months with stable playa conditions and 180 hours of wind speed above the lower wind erosion threshold velocity during months with unstable playa condition. To put this data in better perspective, what was the largest number of hours in a single day when wind speeds exceeded the threshold velocity for wind erosion? And what would the daily wind erosion estimate (pounds per acre per day) be for that day? The PEIR should also provide an assessment of whether that condition would be likely to cause violations of the state or federal 24-hour PM10 standards.

AQ-39 Text and Appendices, Impact Analyses
Further clarification of the potential for wind erosion at Salton Sea to cause violations of ambient air quality standards should be added to the PEIR by performing+E56 a simple dispersion modeling analysis for a generic area of exposed lakebed sediments (for example, a generic 500 acre area). Either ISC3, CALINE3, or CALINE4 would be suitable for this analysis. For simplicity, two meteorological scenarios could be analyzed using 2002 data from Niland: the 24-hour day with the highest recorded wind speed, and the 24-hour day with the greatest number of hours over the wind erosion threshold. Alternatively, the analysis could model the day with maximum predicted wind erosion emissions. Separate runs should be performed for unmitigated conditions and for conditions with placeholder mitigation measures in place. The dispersion modeling analysis would provide information on approximate downwind 24-hour average PM10 concentrations at various distances from the generic source area. (See supplemental discussion below, included in Exhibit X)

> ***Supplemental Discussion,*** Comment **AQ**-39, regarding Text and Appendices, Impact Analyses
> The CALINE3 and CALINE4 models have the advantage of simple data input procedures and the advantage of being designed for ground-level emission sources. However, they require manual input of particle settling and deposition rates and separate runs for each particle size class. The ISC3 model has more complicated data input procedures, but provides for internal calculation of particle settling and deposition rates. A simple 5-category particle size spectrum could be used to improve the realism of the analysis. Particle size distributions must recognize that the "10" in PM_{10} is not a size limit; it is the 50% mass collection efficiency size for certified sampling equipment. PM_{10} samplers collect particles up to about 50 microns aerodynamic equivalent diameter.
>
> A simple 5-category particle size class distribution for silty loam soils could be used for the modeling analysis: Class 1: 0.01 - 2 microns, 1.26 microns MMD; Class 2: 2 - 5

microns, 3.70 microns MMD; Class 3: 5 - 10 microns, 7.77 microns MMD; Class 4: 10 - 20 microns, 15.54 microns MMD; Class 5: 20 - 50 microns, 37.02 microns MMD. A generic particle density would be 2.2 grams per cubic centime+E25ter. For CALINE3 or CALINE4 use, the following settling and deposition rates (centimeters per second) would be appropriate: Class 1: settling = 0.01031; deposition = 0.00020. Class 2: settling = 0.08874; deposition = 0.00375. Class 3 = 0.39064; deposition = 0.04662. Class 4: settling = 1.56255; deposition = 0.42645. Class 5: settling = 8.87370; deposition = 4.20773. A generic mass distribution among size classes might be: Class 1 = 15%; Class 2 = 15%; Class 3 = 25%; Class 4 = 25%; Class 5 = 20%. Silt-sized particles are more easily suspended than are clay or sand sized particles.

AQ-40 Table 10-1, PM10 entry
EPA recently rescinded the annual average national ambient air quality standard for PM10 and revised the 24-hour PM2.5 standard from 65 micrograms per cubic meter to 35 micrograms per cubic meter.

AQ-41 Page 10-5, Paragraph 6
De minimis thresholds apply to actions or portions of actions within a single nonattainment or maintenance area. If a proposed action encompasses more than one nonattainment or maintenance area, then separate de minimis thresholds will apply to those portions of the action in different nonattainment or maintenance areas.

AQ-42 Page 10-7, Paragraph 5
In addition to pollutant transport from Mexico, the Salton Sea Air Basin (especially the northern portion) is affected by pollutant transport from the South Coast Air Basin.

AQ-43 Page 10-17 and 10-18, Tables 10-3 and 10-4
Selecting maximum data values from multiple stations can yield an inaccurate assessment of trends in air quality conditions. Tables 10-3 and 10-4 should be revised to summarize data for individual stations most relevant to the Salton Sea (Indio in Riverside County; Niland, Westmorland, Brawley and El Centro in Imperial County). Ozone and PM10 data from Palm Springs do not seem to be representative of conditions closer to Salton Sea. It also would be useful to extend the data period back to 1996 or earlier to provide at least a 10-year summary for trend evaluation. In addition to providing a better indication of trends, data for individual stations provides information on spatial patterns that cannot be determined from lumped station data. Because there are no significant air quality issues related to ambient standards for NO2, SO2, or CO near the Salton Sea, lumped data are acceptable for Table 10-5 on page 10-19. Data through 2005 are available on the CARB website ([illegible]). (See PM10 and Ozone data sheets, included in Exhibit X)

AQ-44 Page 10-17 and 10-18, Text associated with Tables 10-3 and 10-4
The text should discuss the trends and geograp+E67hic patterns illustrated by the individual station data in revised Tables 10-3 and 10-4. (See supplemental discussion below)

> ***Supplemental Discussion,*** Comment AQ-44, regarding Page 10-17 and 10-18, Text associated with Tables 10-3 and 10-4
> The data summarized on the supplemental PM_{10} and Ozone data sheets indicates that the Palm Springs station is not representative of conditions in the vicinity of Salton Sea. In addition, the information presented in the supplemental ozone data sheet is suggestive of a dual pollutant transport pattern: transport from the South Coast Air Basin affecting the Riverside County portion of the Salton Sea Air Basin (Palm Springs and Indio stations), and ozone (or more likely, ozone precursor) transport affecting the Imperial County portion of the Salton Sea Air Basin. Although peak ozone levels at Westmorland sometimes exceed those at El Centro or Indio, Indio and El Centro have more frequent exceedances of ozone standards than does Westmorland. The Niland station has the

lowest ozone levels and fewest ozone exceedances of any station in the Salton Sea Air Basin. (See PM10 and Ozone data sheets, included in Exhibit X)

Information presented on the supplemental PM_{10} data sheet suggests that local PM_{10} sources are more important than inter-basin pollutant transport in terms of annual average PM_{10} levels. Again, it is clear that the Palm Springs station is not representative of conditions around the Salton Sea. There is not a strong geographic pattern to annual average PM_{10} levels in the Salton Sea Air Basin. The Indio and Westmorland stations tend to have more frequent exceedances of the federal 24-hour PM_{10} standard than do other stations representative of conditions around the Salton Sea. Over the latest 10 years of data, annual average PM_{10} levels have ranged from 49.7 micrograms per cubic meter at Indio to 36.4 micrograms per cubic meter at Niland. The Niland station has the lowest annual average PM_{10} levels and the fewest exceedances of 24-hour standards for stations that might be considered representative of conditions at the Salton Sea.

AQ-45 Page 10-18, Table 10-4
Although EPA has rescinded the federal annual average standard for PM10, that data should be retained in the revised Table 10-4. It is directly relevant to health risk assessments associated with particulate matter, such as the evaluation in Appendix E, Attachment E4.

AQ-46 Page 10-18, Table 10-4
The text should briefly discuss the source areas and causes of the unusually high 24-hour PM10 events that occurred in 2001 and 2003. Were these events evaluated under the EPA exceptional event policy?

AQ-47 Page 10-18, Table 10-4
The footnotes to Table 10-4 should define EPDC (expected peak day concentration).

AQ-48 Page 10-19, Header above Paragraph 1
The header should refer to Nitrogen Oxides and Sulfur Oxides, not Nitrites and Sulfites.

AQ-49 Page 10-19, Paragraph 1 and footnotes to Table 10-5
The text and footnotes to Table 10-5 should clarify that CO data from Calexico have not been used for Table 10-5. CO data from Calexico periodically exceed both state and federal standards. Cross-border traffic is presumed to be a major contributor to this situation, and that condition is not representative conditions at the Salton Sea.

AQ-50 Page 10-26, Paragraphs 7 and 8
The construction impact assessment methodology needs to be revised to be consistent with reasonable construction procedures, especially for alternatives that involve large quantities of rock and gravel hauling. Construction assumptions should recognize the material transport methods identified as most viable in Appendix H-6. See also Comments 2 and 3.

AQ-51 Page 10-27, Paragraph 8
This discussion of soft versus hard crusts in this paragraph applies only to crusting of clay soils or to thin evaporative salt crusts dominated by efflorescent salts such as sodium sulfate or sodium carbonate salts. It does not apply to chloride salts, and thus is not applicable to areas subject to direct salt precipitation from the brine sink features of the various alternatives. Sodium chloride crusts may soften when saturated, but they remain non-emissive and become hard when they dry.

AQ-52 Page 10-28, Paragraphs 1, 2, and 3
This discussion applies only to crusting of clay soils or to thin evaporative salt crusts dominated by efflorescent salts such as sodium sulfate or sodium carbonate salts. It does not apply to chloride salt crusts, which were not tested in the DRI PI-SWERL study, even though a chloride salt crust was available for testing at the Agrarian Research pilot project site. Thus, the seasonal

distinctions discussed here are not applicable to areas subject to direct salt precipitation from the brine sink features of the various alternatives.

AQ-53 Page 10-28, Paragraph 4
What was the basis for selecting 2002 as the data year for the wind speed distribution analysis?

AQ-54 Page 10-28 and Page 10-29, Paragraphs 6 and 7 on page 10-28, Paragraph 1 on page 10-29
The methodology for evaluating fugitive dust emissions from exposed lakebed sediments is generally appropriate, but needs to be revised to distinguish between those lakebed areas which are likely to have a precipitated salt deposit and those that will be free of such deposits. Areas likely to be covered by salt deposits precipitated from brine sink waters will have very different potential emissions than will those areas free of such deposits. See also Comments 10 and 11.

AQ-55 Page 10-29, Paragraphs 1 and 2
At the November air quality working group meeting, the California Air Resources Board raised concerns that the methodology used to estimate fugitive dust from exposed lakebed areas resulted in no emissions from areas at the north end of the Salton Sea. A suggestion was made to change the assumed threshold velocities for wind erosion. The assumed threshold velocities used in the PEIR are reasonable, and are consistent with both literature data and the PI-SWERL data. It would be more appropriate to repeat the wind speed distribution data analysis using data from a meteorological station closer to the Salton Sea than Indio. Based on Figure 10-4, CIMIS station 136 (Oasis) would appear to be the best candidate. Data from the CIMIS station would have to be extrapolated to a 10-meter height. Such extrapolations can be slightly complicated, but even an approximate extrapolation should be tested to see if it demonstrates wind speeds above the assumed threshold velocities. (See supplemental discussion below)

> ***Supplemental Discussion***, Comment AQ-55, regarding Page 10-29, Paragraphs 1 and 2
> One relatively simple method to extrapolate wind speeds from the 2-meter CIMIS station height to a conventional 10-meter height is to first categorize the hourly data values according to assumed atmospheric stability class. If any of the 10-meter stations in the Salton Sea Air Basin provide hourly estimates of stability class conditions, then that data could be used to allow a preliminary extrapolation. Given a 2-meter wind speed and a reasonable estimate of stability class, conventional stationary source dispersion modeling power law exponents can be applied to generate a reasonable first-cut extrapolation. Conventional power law exponents for Rural conditions are: Stability Class A = 0.07; Stability Class B = 0.07; Stability Class C = 0.10; Stability Class D = 0.15; Stability Class E = 0.35; Stability Class F = 0.55. Power Law extrapolation: Speed 2 = Speed 1 * (Height 2/Height1)^P
>
> If none of the meteorological stations in the Salton Sea Air Basin provide estimates of hourly stability class conditions, then stability class estimates can be made using any of three general methods. Pasquill stability estimates can be based on wind speed, generalized daytime solar intensity category, and nighttime cloud cover conditions. An alternative approach uses wind speed categories and the standard deviation of horizontal wind speed fluctuation data (sigma theta) for early morning, mid-day, evening, and nighttime periods to estimate stability class categories. A hybrid approach can also be used combining mid-day solar intensity data (watts per square meter) and sigma theta data for morning, evening, and nighttime hours. There is nothing absolutely sacred about the specific wind speed categories used by different references. If it seems appropriate, wind speed categories can be adjusted somewhat. The wind speed categories used by Hanna et al. 1982 and Zannetti 1990 seem excessively broad.
>
> **References for stability class estimation methods:**

Beer, Tom. 1990. Applied Environmetrics Meteorological Tables. Applied Environmentrics. Balwyn, Victoria. Australia.

Hanna, S. R., G. A. Briggs, and R. P. Hosker, Jr. 1982. Handbook on Atmospheric Diffusion. (DOE/TIC-11223.) National Technical Information Service. Springfield, VA.

Turner, D. Bruce. 1994. Workbook of Atmospheric Dispersion Estimates: An Introduction to Dispersion Modeling. Second Edition. CRC Press. Boca Raton, FL.

US Environmental Protection Agency. 1995. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models. Volume I: User Instructions. (EPA-454/B-95-003a). Office of Air Quality Planning and Standards. Research Triangle Park, NC.

Zannetti, P. 1990. Air Pollution Modeling: Theories, Computational Methods and Available Software. Van Nostrand Reinhold. New York, NY.

AQ-56 Page 10-29, Paragraphs 1 and 2
Figure D2 in Appendix D shows more CIMIS stations than are shown in Figure 10-4. If stations 141 (Mecca) or 154 (Salton Sea North) have data from an appropriate period and show higher maximum wind speeds than does station 136 (Oasis), then they might be a more appropriate choice as an alternative to the Indio wind speed data.

AQ-57 Page 10-29, Paragraph 4
The analysis of fugitive dust from exposed areas under Alternative 7 needs to be revised to reflect the air quality mitigation features incorporated into the basic design of this alternative. Alternative 7 would not have "large areas of Exposed Playa without long term control measures." The protective salt cap feature of this alternative will provide complete protection from wind erosion for the covered area.

AQ-58 Page 10-29, Paragraph 6
What is the basis for assuming that water-efficient vegetation cover will provide 95% control of fugitive dust emissions? Does the effectiveness of fugitive dust control by vegetation decline at high wind speeds? What is the basis for assuming that a protective salt flat will have only an 85% control effectiveness? If there is no exposure of the underlying playa sediments and the salt deposit is primarily halite, then there will be no wind erosion and the control effectiveness will be 100%.

AQ-59 Page 10-33, Paragraph 2
The text above Table 10-12 should refer to projects in the SCAQMD portion of the Salton Sea Air Basin.

AQ-60 Page 10-36, Table 10-14, Assumption 3
Emission rates for diesel haul trucks should be revised as necessary to reflect the use of large capacity off-road haul trucks for those alternatives where that transport method appears to be the most viable, either as the main transport mechanism or in conjunction with rail or conveyor systems. See also Comments 2 and 3.

AQ-61 Page 10-36, Table 10-14, Assumption 4
Table 10-14 should identify the assumed capacity of haul trucks (20 cy noted in Attachment E2). Why didn't the PEIR assume the use of construction methods which Appendix H-6 characterizes as "probably the most viable options" for transporting rock and gravel from quarry sites?

AQ-62 Page 10-36, Table 10-14, Assumption 6, second bullet item
What vegetation cover density is required to achieve the postulated 95% control effectiveness? What is the basis for assuming 95% control at this cover density? Has this effectiveness been proven at the cover density and water application rate assumed for the PEIR? Does the control

AQ-70 Pages 10-71 through 10-73, Paragraphs where emission estimates are presented
Construction emissions analyses for the Alternative 4 probably do not need much revision. Fugitive dust emissions analyses for exposed lakebed areas under Alternative 4 need to be revised to discriminate between lakebed sediment areas exposed before the brine sink reaches saturation for chloride salts and lakebed sediment areas that are likely to be capped by direct precipitation of chloride salts after brine sink waters reach saturation. Based on projected salinity levels, it appears that the brine sink would reach saturation by the end of Phase II.

AQ-71 Pages 10-73 through 10-76, Paragraphs where emission estimates are presented
Construction emissions analyses for the Alternative 5 need to be revised to reflect reasonable construction procedures and material transport methods such as those discussed in Appendix H-6. Fugitive dust emissions analyses for exposed lakebed areas under Alternative 5 need to be revised to discriminate between lakebed sediment areas exposed before the brine sink reaches saturation for chloride salts and lakebed sediment areas that are likely to be capped by direct precipitation of chloride salts after brine sink waters reach saturation. Based on projected salinity levels, it appears that the brine sink would reach saturation during Phase II.

AQ-72 Pages 10-76 through 10-79, Paragraphs where emission estimates are presented
Construction emissions analyses for the Alternative 6 need to be revised to reflect reasonable construction procedures and material transport methods such as those discussed in Appendix H-6. Fugitive dust emissions analyses for exposed lakebed areas under Alternative 6 need to be revised to discriminate between lakebed sediment areas exposed before the brine sink reaches saturation for chloride salts and lakebed sediment areas that are likely to be capped by direct precipitation of chloride salts after brine sink waters reach saturation. Based on projected salinity levels, it appears that the brine sink would reach saturation during Phase II.

AQ-73 Pages 10-79 through 10-82, Paragraphs where emission estimates are presented
Construction emissions analyses for the Alternative 7 need to be revised to reflect reasonable construction procedures and material transport methods such as those discussed in Appendix H-6. Fugitive dust emissions analyses for exposed lakebed areas under Alternative 7 need to be revised to discriminate between lakebed sediment areas exposed without a protective salt cap and lakebed sediment areas that will be protected by a salt cap. Based on projected salinity levels, it appears that the brine sink would reach saturation during Phase II.

AQ-74 Pages 10-82 through 10-85, Paragraphs where emission estimates are presented
Construction emissions analyses for the Alternative 8 need to be revised to reflect reasonable construction procedures and material transport methods such as those discussed in Appendix H-6. Fugitive dust emissions analyses for exposed lakebed areas under Alternative 8 need to be revised to discriminate between lakebed sediment areas exposed before the brine sink reaches saturation for chloride salts and lakebed sediment areas that are likely to be capped by direct precipitation of chloride salts after brine sink waters reach saturation. Based on projected salinity levels, it appears that the brine sink would reach saturation during Phase II.

AQ-75 Page 10-85 and Page 10-86, Paragraph 1 on page 10-85 and Paragraph 2 on page 10-86
A realistic analysis of construction emissions cannot be deferred to the project-specific EIR, since relative construction emission estimates as presented in the PEIR are being considered in the process of selecting a preferred alternative. It is essential that the comparison of emissions associated with the various alternatives be fair, objective, and reasonable. A reasonable comparison must consider those features of the different alternatives that are likely to result in different construction methods and material transport methods than those assumed in the draft PEIR analyses.

AQ-76 Attachment E1, Tables
The tables in Attachment E1 will need to be updated to reflect revised emissions analyses consistent with the other comments concerning impact assessment methods and analyses.

AQ-77 Attachment E2, Tables and text
The text and tables in Attachment E2 will need to be updated to reflect revised emissions analyses consistent with the other comments concerning impact assessment methods and analyses.

AQ-78 Attachment E2, Table E2-7 and associated text
Different conformity *de minimis* thresholds apply in the Riverside County and Imperial County portions of the study area. The evaluation of net emission increases compared to No Action should distinguish between Riverside County and Imperial County emissions.

AQ-79 Attachment E2, Pages after Table E2-7
Tables E2-8 through E2-13 are missing from the PDF file for Appendix E (both the CD and the DWR website).

AQ-80 Attachment E3, Text and tables
Attachment E3 should be revised to incorporate the results from the final DRI study report.

AQ-81 Attachment E3, Pages E3-2 and E3-7, Paragraph 2 on page E3-2, Paragraph 7 on page E3-7
What was the basis for selecting 2002 as the meteorological data year? If a change is made in the meteorological data set or station selected to represent the northern portion of the Salton Sea (*see Comment 55*), then the discussion in Attachment E3 will need to be modified.

AQ-82 Attachment E3, Page E3-4, Stable versus Unstable Crust
The emissions analyses need to separate sodium chloride crust areas from other types of crusts. Areas covered with sodium chloride crusts will have virtually no wind erosion emissions in any season. The DRI data for "stable crust" areas are not representative of areas covered with a sodium chloride salt crust. DRI failed to make PI-SWERL measurements at stable sodium chloride crust locations at the Salton Sea. (See supplemental discussion for Comment 55)

AQ-83 Attachment E3, Page E3-5, Table E3-3
This table should be updated to reflect data from the final DRI report, any revisions to the wind speed frequency analysis for the northern portion of the Salton Sea, and distinction between areas expected to have a sodium chloride salt crust and other types of exposed sediments.

AQ-84 Attachment E3, Page E3-6, Paragraph 4
This discussion applies only to efflorescent salt crusts. It does not apply to halite salt crusts, which do not undergo mineralogical phase changes in response to temperature and moisture.

AQ-85 Attachment E3, Page E3-8, Areas of Exposed Playa
The PEIR analysis needs to distinguish between areas expected to have a halite salt crust and other types of exposed areas.

AQ-86 Attachment E3, Page E3-8, Paragraph 2
This paragraph says that "data from the Niland station indicate that wind speeds exceeded 35 mph at times during 2002", but Table E3-3 does not reflect any wind events for the wind speed range of 35 - 40 mph. Is there a typo on page E3-8, or is there an error in Table E3-3?

AQ-87 Attachment E3, Page E3-11 and Tables E3-5, E3-6, and E3-7, Paragraph 2, 5th bullet item on page E3-11; Tables E3-5, E3-6, and E3-7
The PEIR needs to separate out areas around the brine sink of each alternative where a sodium chloride salt crust can be expected to form after the brine sink reaches saturation with respect to sodium chloride. Areas between the water level of the brine sink at that stage and the miminum brine sink area in Phase IV would have a sodium chloride crust that could be maintained to

provide complete control of fugitive dust. Areas covered by a halite salt crust would not constitute "exposed playa area". Maintenance of a halite salt crust is relatively simple: merely apply concentrated brine to the salt deposit if precipitation events dissolve the crust and it does not reform from groundwater under the former crust area. This method was demonstrated by the 5-year Salt Laydown Project at Bonneville Salt Flats. (See supplemental discussion below)

Supplemental Discussion, Comment AQ-87, regarding Attachment E3, Page E3-11, Paragraph 2, 5th bullet item
Brine extracted from the playa sediments under the Bonneville Salt Flats has been used for commercial potash production for many decades. Studies conducted between 1960 and 1988 showed that this brine extraction had reduced of the original salt flat acreage and salt flat thickness. The Bureau of Land Management conducted a 5-year test program from 1997 to 2002 to help restore the salt deposits. This test program demonstrated that halite precipitated in concentration ponds during the potash production process could be re-dissolved and returned to the salt flats. The amount of salt returned to the Bonneville Salt Flat system during the 5-year test program (an average of 1.2 million tons per year) exceeded the amount removed in brine pumped from the playa sediments for potash production (an average of 0.85 million tons per year). The replenishment program operated from November through April of each fiscal year. Approximately 19,192 acre-feet (6.3 billion gallons) of brine were delivered to the salt flats during the 5-year replenishment program (15,857 hours of pumping).

In addition to increasing the thickness of the existing salt crust, the salt laydown project resulted in about 5 square miles (3,200 acres) of new salt crust formation, mostly on the eastern side of the Salt Flats where commercial brine extraction had eliminated historic salt crust.

References for the Bonneville Salt Flats Salt Laydown Project:

White, W. W. III. and Glenn D. Wadsworth. 2001. Salt Laydown Project - Bonneville Salt Flats: 1997 - 1999 Progress Report. Document downloaded from BLM website (www.ut.blm.gov/wh3bsfsalt.html) on November 14, 2006.

White, W. W. III. 2002. Salt Laydown Project: Replenishment of Salt to the Bonneville Salt Flats. Pages 433 - 486 in J. Wallace Gwynn, ed., Great Salt Lake: An Overview of Change. Special Publication of the Utah Department of Natural Resources, Utah Geological Survey. Document downloaded from BLM website (www.ut.blm.gov/wh3bsfsalt.html) on November 14, 2006.

White, W. W. III. 2004. Replenishment of salt to the Bonneville Salt Flats: Results of a 5-Year Experimental Salt Laydown Project. Pages 243 - 262 in S. B. Castor, K. G. Papke, and R. O. Meeuwig, eds., Bettin on Industrial Minerals, Proceedings of the 39th Forum on the Geology of Industrial Minerals, May 19 - 21, 2003, Sparks, Nevada. Nevada Bureau of Mines and Geology Special Publication 33. Document downloaded from BLM website (www.ut.blm.gov/wh3bsfsalt.html) on November 14, 2006.

White, W. W. III. 2004. Appendices for Replenishment of Salt to the Bonneville Salt Flats: Results of a 5-Year Experimental Salt Laydown Project. Document downloaded from BLM website (www.ut.blm.gov/ wh3bsfsalt.html) on November 14, 2006.

AQ-88 Attachment E3, Page E3-11; Tables E3-5, E3-6, and E3-7; Page E3-19, Paragraph 5 on page E3-11; Tables E3-5, E3-6, and E3-7; Paragraph 2 on page E3-19
The Final PEIR needs to be revised to reflect current designs and assumptions of Alternatives 4 and 7, as well as refinements to other alternatives that may be warranted by public review of the Draft PEIR.

AQ-89 Attachment E3, Page E3-12, Paragraphs 1 and 2
The Final PEIR needs to revise these paragraphs to reflect revised emissions analyses consistent with the other comments concerning impact assessment methods and analyses

AQ-90 Attachment E3, Page E3-19, Paragraph 4
What is the basis for assuming that water-efficient vegetation cover will provide 95% control of fugitive dust emissions? What is the basis for assuming that a protective salt flat will have only an 85% control effectiveness? If there is no exposure of the underlying playa sediments and the salt deposit is primarily halite, then there will be no wind erosion and the control effectiveness will be 100%.

AQ-91 Attachment E3, Page E3-19, Paragraph 8
Appendix E3D was not included on the CD for the PEIR. Perhaps this paragraph should be deleted from Attachment E3.

AQ-92 Attachment E3, Page E3-21 through E3-24, Tables E3-8 through E3-11
These tables need to be updated to reflect revised emissions analyses consistent with the other comments concerning impact assessment methods and analyses

AQ-93 Attachment E5, Page E5-1, Paragraph 3
Mitigation measures such as these should be assumed for the impact analysis E114of alternatives which require transport of large quantities of rock and gravel. *See also Comments 2 and 3.*

AQ-94 Attachment E5, Pages E5-3, E5-4, and E5-5, Figures E5-1, E5-2, and E5-3
These figures and the associated text need to be updated to reflect revised emissions analyses consistent with the other comments concerning impact assessment methods and analyses

AQ-95 Attachment E7, Page E7-2, Paragraph 3
Although this paragraph says wind speed data for 2001 through 2005 were evaluated, Table E7-1 indicates that data from 2005 were not used. Was any analysis undertaken to see how average and peak wind speeds for 2001 through 2004 compared to wind speeds in the data sets from the 1990s?

AQ-96 Attachment E7, Page E7-15, Paragraph 4
The PEIR analysis needs to distinguish between areas expected to have a halite salt crust and other types of soil or salt crusts. Halite salt crusts will not show seasonal differences in emissivity.

AQ-97 Attachment E7, Page E7-16 and Attachment E9, Page E9-1, Paragraph 1 on page E7-16; Paragraph 1 on page E9-1
As shown by Table E9-4 and Appendix D in Attachment E9, the average condition of Salton Sea waters should precipitate a halite salt crust. The presence of efflorescent salt crusts around the southern shoreline of Salton Sea suggests that conditions there may be different from the average condition of Salton Sea waters. The PEIR fails to evaluate the conditions and mechanisms that create these deposits. Thus, it is not at all obvious that similar conditions will exist elsewhere when the level of the Salton Sea is lowered significantly from current conditions. A thorough evaluation of this situation is essential at the programmatic level to ensure a realistic assessment of the potential for fugitive dust generation from exposed lakebed sediments. The PEIR also fails to recognize that halite salt crusts are quite different from clay soil crusts or efflorescent salt deposits, and would provide a non-emissive cap on the underlying sediments.

AQ-98 Attachment E7, Page E7-16, Paragraph 2
All that has been found at Salton Sea in terms of efflorescent salt deposits is a seasonal occurrence of deposits in a shoreline zone apparently influenced by wave run-up effects, and possibly influenced by water circulation conditions that are not typical of other portions of the

Salton Sea and which may not exist when water levels decline significantly. The Great Salt Lake does not appear to have salt-related fugitive dust problems associated with extensive lakebed areas exposed by declining water levels over the last 17 years. The water chemistry of the Salton Sea is more similar to that of Great Salt Lake than it is to the groundwater underlying the Owens Lake playa.

AQ-99 Attachment E7, Page E7-16, Paragraph 3
Investigating the hydrologic mechanisms and other conditions associated with the limited seasonal efflorescent salt deposits found along the southern shoreline of Salton Sea is at least as important as field observations of these deposits in terms of predicting the future condition of lakebed sediments that will be exposed by a lowering water levels. This should have been a primary task of the PEIR analyses, since it is essential for a proper evaluation of future conditions at a programmatic level. See also Comments 18, 19, 22, 23, 24, and 25.

AQ-100 Attachment E7, Pages E7-16 and E7-17, Paragraph 8 on page E7-16, continuing to Paragraph 1 on page E7-17
The PEIR needs to recognize halite salt crusts as a feature completely distinct from efflorescent salt crusts or clay soil crusts. Halite salt crusts to not undergo seasonal changes that lead to high emission rates. Future conditions cannot be properly evaluated without separating areas that will be covered by a halite salt crust from other areas exposed by lowered water levels.

AQ-101 Attachment E7, Page E7-17, Paragraph 3
The discussion in this paragraph applies only to crusting of clay soils or to thin evaporative salt crusts dominated by efflorescent salts such as sodium sulfate or sodium carbonate salts. It does not apply to chloride salts, and thus is not applicable to areas subject to direct salt precipitation from the brine sink features of the various alternatives. Sodium chloride crusts may soften when saturated, but they remain non-emissive and become hard when they dry.

AQ-102 Attachment E8, Pages E8-23 through E8-31
The increase in wind speed with height above the ground varies according to atmospheric stability class. Why didn't the analysis for the correlation between CIMIS 2-meter wind speed and 10-meter data use conventional dispersion modeling power law extrapolation procedures? The data analysis could have tested conventional power law exponents against site-specific data, or it could have developed site-specific power law exponents could then be computed for each stability class. The conventional approach first sorts data pairs according to atmospheric stability class before attempting to determine correlation coefficients or power law exponents. Trying to find a single extrapolation factor simply builds errors into the analysis.

AQ-103 Attachment E9, Page E9-1, Paragraph 2 on page E9-1
All that has been found at Salton Sea in terms of efflorescent salt deposits is a seasonal occurrence of deposits in a shoreline zone apparently influenced by wave run-up effects, and possibly influenced by water circulation conditions that are not typical of other portions of the Salton Sea and which may not exist when water levels decline significantly. The Great Salt Lake does not appear to have salt-related fugitive dust problems associated with extensive lakebed areas exposed by declining water levels over the last 17 years. The water chemistry of the Salton Sea is more similar to that of Great Salt Lake than it is to the groundwater underlying the Owens Lake playa.

AQ-104 Attachment E9, Page E9-1, Paragraph 2 on page E9-1
Chemical modeling and laboratory evaluations are essential for a proper understanding of the mechanisms that either lead to or avoid fugitive dust problems at saline lakes. The salt precipitation sequences that formed in Owens Lake as it desiccated are in fact very predictive, and explain why fugitive dust problems arose at Owens Lake. If sodium chloride had been the first salt to precipitate as Owens Lake desiccated, there would be a non-emissive halite crust on the outer playa area at Owens Lake, and the current fugitive dust problem there would not have developed. Instead, initial salt balances and water temperature conditions at Owens Lake led to

the initial precipitation of sodium carbonate and bicarbonate salts, followed by sodium sulfate salts. These salts precipitated on the outer playa area, and became the source of the efflorescent salt formations that continue to affect playa conditions in a way that leads to dust storm events.

AQ-105 Attachment E9, Page E9-1, Paragraph 2 on page E9-1
As Vic Etyemezian from DRI noted in his handouts at the November 7, 2006 air quality working group meeting, "Salt chemistry has a huge role" in determining fugitive dust emissions from exposed playas.

AQ-106 Attachment E9, Page E9-1, Table E9-1
There is a typo in the chemical name for gypsum; gypsum is calcium sulfate dihydrate.

AQ-107 Attachment E9, Pages E9-1 and E9-2, Paragraph 3 on page E9-1, continuing to Paragraph 1 on page E9-2
Investigating the hydrologic mechanisms and other conditions associated with limited seasonal efflorescent salt deposits found along the southern shoreline of Salton Sea is at least as important as field observations of these deposits in terms of predicting the future condition of lakebed sediments that will be exposed by a lowering of water levels. This should have been a primary task of the PEIR analyses, since it is essential for a proper evaluation of future conditions at a programmatic level. If you do not understand the processes that create the existing deposits, how can you make a reliable assumption about whether or not similar processes will exist under changing conditions? See also Comments 18, 19, 22, 23, 24, and 25.

AQ-108 Attachment E9, Page E9-2, Paragraph 3 on page E9-2
The important comparison to make between the chemistry of Salton Sea and Owens Lake is the combination of sulfate, carbonate, and bicarbonate versus chloride. The groundwater under the Owens Lake playa has a sulfate/carbonate content nearly three times higher than that of Salton Sea. The salt balance in the Salton Sea is nearly 85% chloride.

AQ-109 Attachment E9, Page E9-2, Paragraph 6
While it is true that salts precipitated from solution as a lake desiccates may not have the same crystal structures that develop in efflorescent deposits when lakebed deposits are subsequently exposed, the basic chemistry of the precipitated salts determines the range of evaporative salt minerals that can form. A precipitated sodium carbonate deposit will only generate sodium carbonate/bicarbonate salts in an evaporite deposit. A precipitated sodium sulfate deposit will only generate sodium sulfate salts in an evaporite deposit. A precipitated chloride salt will only generate chloride salts in an evaporite deposit.

AQ-110 Attachment E9, Pages E9-2 and E9-3, Paragraph 6 on page E9-2, continuing to page Paragraph 1 on page E9-3
If the PEIR is using "efflorescence" as a generic synonym for the formation of an evaporative salt deposit, then the document must consistently include a discussion of whether the resulting deposit is a stable, non-emissive salt or a mineral form that undergoes phase change reactions that generate emissive non-crystalline powders (the mineralogical definition of efflorescent salts). Halite does not undergo phase changes from a crystalline solid to a non-crystalline amorphous powder. Page E9-4 notes that halite will either be present as a stable crystalline form or it will dissolve into a slurry. Neither condition would be emissive.

AQ-111 Attachment E9, Page E9-3, Paragraph 2
The discussion focuses entirely on a small component of the salts which are expected to precipitate from Salton Sea water, and completely ignores the fact that the vast majority of a salt deposit formed will be halite, which does not form emissive deposits. Sulfate is only a small component of the dissolved mineral load in Salton Sea. The comparison to Owens Lake is misleading and incomplete because the dominant efflorescent salts at Owens Lake are carbonate/bicarbonate salts, not sulfate salts.

AQ-112 Attachment E9, Page E9-3, Paragraph 3
Because the PEIR fails to distinguish between a generic definition of efflorescence and the mineralogical definition of efflorescence, it draws misleading and erroneous conclusions about whether different salts formed in evaporative deposits are emissive. Halite and gypsum can form in evaporative deposits, but that does not make the resulting deposits emissive. The PEIR needs to make a very clear and consistent distinction between the mere formation of evaporative salt deposits and whether or not those deposits would be emissive.

AQ-113 Attachment E9, Page E9-3, Paragraphs 4 and 5
This is a description of evaporative salt deposit formation. It does nothing to explain whether or not the resulting deposit will be efflorescent in a mineralogical sense or whether or not the resulting deposit will be emissive.

AQ-114 Attachment E9, Pages E9-3 through E9-6, Paragraph 7 on page E9-3 through Paragraph 3 on page E9-6
The entire discussion of specific salt minerals needs to make a clear distinction between the mechanism of formation (whether called evaporative or efflorescent) and the stability or emissiveness of the resulting deposit. Only those mineral forms that undergo phase change reactions in response to changing temperature and humidity conditions have the potential to generate emissive deposits. Halite can be formed as an evaporite deposit, but such deposits are not efflorescent in a mineralogical sense, and do not exhibit high emission rates. In general, calcium salt deposits are stable, as are chloride salt deposits. In general, it is only certain sodium salts (sodium carbonate/bicarbonate salts and sodium sulfate salts) that are emissive in a playa setting.

AQ-115 Attachment E9, Page E9-5, Paragraph 3
This discussion assumes that sodium sulfate salts will precipitate on exposed lakebed deposits as water levels decline and overall salinity levels rise. The PEIR has provided no evidence that this will in fact happen. The relative salt balance of the Salton Sea (85% chloride salts on a molar ratio basis) and water temperature conditions suggest that it is likely that sodium chloride will be the first salt to precipitate, thus capping and protecting the underlying sediments. Appendix B to Attachment E9 and Table E9-4 clearly indicate that halite is the expected dominant salt. The salt saturation curve sheet (included at the end of these comments) indicates that chloride salts precipitate at lower concentrations than do sulfate salts under warm water temperatures. The PEIR failed to provide a timeline of future salt balance conditions. There is no basis for assuming that the relatively low sulfate concentrations in Salton Sea will reach saturation before the much higher chloride concentrations. (See salt saturation curve sheet, included at the end of these comments)

AQ-116 Attachment E9, Page E9-6, Paragraph 4 on page E9-6
The text of PEIR Attachment E9 presents a very misleading comparison of the Salton Sea and Owens Lake systems. Most importantly, the text comparing Owens Lake and Salton Sea on page E9-6 ignores carbonate/bicarbonate salts, which are the dominant emissive salt types at Owens Lake. Sulfate salts are only a portion of the salt types of interest. The combination of carbonate, bicarbonate, and sulfate salts is the real group of salts that are of interest. Based on the molar percent data in Table E9-4, the Salton Sea system has only 16% sulfate/carbonate/bicarbonate salts while the groundwater under the Owens Lake play has 47% sulfate/carbonate/bicarbonate salts. The Owens Lake system is nearly 3 times higher in relative sulfate/carbonate content than the Salton Sea. Clearly, the chemistry of the Owens Lake system is substantially different from that of the Salton Sea system. (See supplemental discussion below and table sheet, included at the end of these comments)

> ***Supplemental Discussion***, Comment AQ-116, regarding the comparison of Salton Sea with Owens Lake

The salt deposits that contribute to air quality problems at Owens Lake trace their origin to the initial desiccation of Owens Lake. That desiccation produced a vertical and horizontal stratification of salt minerals, with sodium carbonate salts being the first to precipitate, followed by sodium sulfate salts and sodium carbonate-sulfate double salts. Sodium chloride salt precipitated later, and primarily in the area of the current residual brine pool. Sodium carbonate and sodium sulfate salts dominated the deposits on the outer playa area within the pre-desiccation shoreline of Owens Lake. The solubility of the initial sodium carbonate and sodium sulfate deposits precluded formation of permanent surface deposits. But the high solubility of these salts ensured that they would be the major source of the salt load in the underlying playa sediments and shallow groundwater. The chemistries of the residual brine pool and surface water inflows do not reflect the chemistry of Owens Lake prior to desiccation and deposition of massive salt deposits.

When considering the potential for salt deposit formation at a saline lake, it is important to consider not only the molar percents, but also the absolute concentrations of the major salt ions in the waters that are likely to be the source of salt deposits. The absolute concentrations are key to determining whether salts will reach saturation and be precipitated as the water balance of a saline lake is changed.

The tables on the following worksheet provide a comparison of major salts in pre-desiccation Owens Lake, Mono Lake, Great Salt Lake, and Salton Sea. Comparable data for ocean water is provided for additional comparison. As can be seen, not only did pre-desiccation Owens Lake have an absolute sulfate concentration that was higher than that of the Salton Sea, Owens Lake had carbonate concentrations that were almost twice as high as the Owens Lake sulfate concentrations. The combined sulfate/carbonate concentration of pre-desiccation Owens Lake was more than 4.3 times higher than the current sulfate/bicarbonate content of the Salton Sea. See Supplemental Tables, at the end of these comments.

When comparisons between Salton Sea and Owens Lake are based on molar ratios, the combined sulfate/carbonate content of pre-desiccation Owens Lake was 2.5 times the sulfate/bicarbonate content of the Salton Sea (using data from pre-desiccation Owens Lake in the supplemental table sheet, included at the end of these comments). If the comparison is based on current groundwater chemistry under the playa (Table E9-4 of PEIR Appendix E9), then Owens Lake has 2.95 times as much sulfate/carbonate content as the Salton Sea. Clearly, no matter what data are used for the comparison, Owens Lake has a chemistry that is significantly different than the chemistry of the Salton Sea. In addition, it must be recognized that the spatial distribution of salts produced by the Owens Lake desiccation will not happen at Salton Sea until it desiccates to the point where major salts reach saturation. And it must also be recognized that water temperature patterns at Salton Sea are likely to result in a different sequence of salt precipitation than occurred at Owens Lake. At Salton Sea, sodium chloride salts are likely to precipitate first, not last.

References for history of salt deposit formation and chemistry at Owens Lake:

Alderman, S. S., Jr. 1985. Geology of the Owens Lake Evaporite Deposit. Pages 75-83 in Sixth International Symposium on Salt, Volume 1. The Salt Institute. Alexandria, VA.

Smith, G. I. and I. Friedman. 1986. Seasonal Diagenic Changes in Salts of Owens Lake, California. Pages 21-29 in F. A. Mumpton, (ed.), Studies in Diagenesis. (U.S. Geological Survey Bulletin 1578.)

Smith, G. I., I. Friedman, and R. J. McLaughlin. 1987. Studies of Quaternary Saline Lakes - III. Mineral, Chemical, and Isotopic Evidence for Salt Solution and Crystallization

Processes in Owens Lake, California, 1969-1971. Geochimica et Cosmochimica Acta 51:811-827.

AQ-117 Attachment E9, Page E9-6, Paragraph 4
In discussing Table E9-4, the text should note that the closest match to Salton Sea chemistry at Owens Lake is the residual brine pool, which is not a source of significant fugitive dust emissions. The groundwater under the playa is the dominant source of salt deposits on the Owens Lake playa. The chemistry of Salton Sea water is distinctly different from the groundwater under the Owens Lake playa. The text should also note that while springs and intermittent surface drainages provide water to the Owens Lake system, they are not important direct contributors to the overall salt balance of the system (which is dominated by salts precipitated when Owens Lake desiccated and which subsequently dissolved and have affected the groundwater underlying the playa).

AQ-118 Attachment E9, Pages E9-2 and E9-6, Paragraph 3 on page E9-2 and Paragraph 4 On page E9-6
In addition to correcting the comparison between Salton Sea and Owens Lake, Attachment E9 should present a comparison between Salton Sea and Great Salt Lake. Overall, the molar percents for salt anions at Salton Sea are closer to those of Great Salt Lake (or to sea water) than to Owens Lake: as molar percents, 84% chloride at Salton Sea, 95% chloride at Great Salt Lake, 59% chloride at historic Owens Lake, and 51% chloride in Owens playa groundwater; 16% sulfate/carbonate at Salton Sea, 5% sulfate/carbonate at Great Salt Lake, 41% sulfate/carbonate at historic Owens Lake, and 47% sulfate/carbonate in Owens playa groundwater.
(See supplemental table sheet, included at the end of these comments)

AQ-119 Attachment E9, Page E9-6, Paragraph 5
The stated conclusion that "crystallized salt sequences occurring in evaporating brine pools are not predictive of the salts that occur in a playa setting" is incorrect. The basic chemistry of the salts precipitated in a brine pool determines the basic chemistry of any evaporative salts that subsequently form on the playa. All that changes is the crystalline structure and water of hydration. The sequence of salt precipitation as Owens Lake desiccated was entirely predictive of the efflorescent salts that now form on the outer playa at Owens Lake.

AQ-120 Attachment E9, Page E9-7, Paragraph 1
The first part of Conclusion 2 is true only if it is clearly and explicitly stated that "efflorescence" is being used in a generic sense meaning that the salts can form in evaporative deposits, and that as used in this sense, efflorescence does not imply anything about whether or not the resulting salt deposit would be emissive. The statement that the typical morphology of these salts is elongated whiskers is not true. Chloride salts form crystalline structures that would seldom be described as whiskers. The DRI study did not describe the morphology of any of the salt deposits along the southern shoreline of Salton Sea as whiskers. The common descriptions were "smooth crust", "botryoidal crust", "irregular crust", or "hummocky crust". The most emissive salt deposit morphology would be described as "powdery".

AQ-121 Attachment E9, Page E9-7, Paragraph 3
There is little evidence in the PEIR to support the second sentence of Conclusion 4. Presumed (but not confirmed) sulfate salt deposits have been found primarily along the southern shoreline of Salton Sea, but there was no evaluation of the hydrologic mechanisms responsible for these deposits, and no evaluation to determine if unusual conditions (localized water inflows high in sulfate content, location-specific water circulation conditions, etc.) are responsible for these deposits. The general water chemistry of Salton Sea (Tables E9-2 and E9-4) indicates that chloride salts should dominate the deposits when water levels decline and overall salinity increases. (See also Comments 18, 19, 22, 23, 24, and 25)

AQ-122 Attachment E9, Page E9-7, Paragraph 4

AQ-127 Attachment E9, Appendix D, Figure in Appendix D to Attachment E9
It should be noted that the concentration axes on both Appendix D of Attachment E9 and the saturation curve sheet (included at the end of these comments) are in weight percents of salt compounds, not molar percents of anions or cations. Table E9-2 presents elemental concentrations for the major salts in Salton Sea, but does not provide an actual salt balance in weight percents. Thus, it is difficult to determine where the current sulfate and chloride salt concentrations are in relation to temperature-dependent saturation curves. Information on the estimated salt balance of the Salton Sea (as specific salt compounds, not just anions and cations separately) is necessary to evaluate the potential for direct salt precipitation at different temperatures. (See Salt Saturation Curve sheet, included at the end of these comments)

AQ-128 Attachment E9, References
Attachment E9 does not include a bibliography of references cited.

AQ-129 Appendix H-3, Page H3-2; and Attachment E6, Page E6-2, Paragraph 2 on page H3-2; Paragraph 2 on page E6-2
The PEIR should note that water used for air quality management purposes does not have to be fresh water. Measures that use saline water would have a water use advantage over those that require fresh water. As is clear from Table E9-4 and Appendix D to Attachment E9, water with the average composition of Salton Sea will precipitate a halite salt crust, not a sodium sulfate or sodium carbonate salt crust.

AQ-130 Appendix H-3, Pages H3-2 and H3-8; and Attachment E6, Page E6-2, Paragraph 8 on page H3-2; Paragraph 5 on page H3-8; Paragraph 8 on page E6-2
The 2003 Owens Valley PM_{10} SIP says 2.5 acre-ft per year of water is needed to maintain a saltgrass cover density of 50% (combined live and dead vegetation). Water requirements for the initial years of vegetation establishment at Owens Lake were higher (up to 7 acre-ft per acre in the first year). What evidence is there that 1.2 acre-ft per year of water (or less) will be sufficient to achieve effective vegetation cover in the Salton Sea area?

AQ-131 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Stabilization with brine is clearly a feasible mitigation measure. Common experience with both natural and man-made halite salt crusts proves they are stable and can cover extensive areas. Page H3-16 states that "Natural formation of stable surface crusts is an important natural control mechanism of particulate emissions from playas throughout the western U.S. When the salt crusts remain stable, control efficiencies approaching 100 percent are common." The burden of proof is on the PEIR to demonstrate that halite salt crusts are not stable and are not effective. The Bonneville Salt Flats have endured for centuries, if not millennia. A demonstration of halite crusts is in place at the Salton Sea, but was ignored by the PEIR. (See also Comments 30 and 31)

AQ-132 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Utah's experience with both natural and man-made halite salt crusts proves that they are effective at large scale (over a million acres) and over the long term (centuries). The Utah Division of Air Quality website indicates that the only PM_{10} nonattainment areas in the state are in the urbanized areas along the Wasatch Front, and Utah has requested redesignation to attainment for all federal PM_{10} nonattainment areas in Utah. The Utah Regional Haze SIP makes no mention of fugitive dust from salt flats as a contributor to regional haze problems. (See also Comments 30 and 31)

AQ-133 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1

Evaluations to confirmation of the effectiveness of stabilization with brine and creation of permanent halite salt caps should have been conducted as part of the PEIR. This is a programmatic issue, not a design-specific issue for selected alternatives. Each alternative has a residual brine sink that could be used as a water source for this mitigation approach. (See also Comments 30 and 31)

AQ-134 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Stabilization with brine does not require fresh water, which is a scarce resource. The brine sinks associated with each alternative would provide a ready water supply for this measure. This is an important benefit of stabilization with brine that should be emphasized.

AQ-135 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Where would stabilization with brine cause ponding that could mobilize selenium into the food chain for birds? The most important invertebrates would be lost from the brine sink created by each alternative by the end of Phase I, and all invertebrates would be eliminated in Phase II. The brine sink would not be a significant food web link by the end of Phase I. Likewise, a permanent salt flat would not be a meaningful food chain link for birds at the Salton Sea. Even for the portion of Phase I when brine sink salinities might allow development of invertebrate populations, what properties of ponded brine make it more likely to mobilize selenium into the food chain of birds than is the case for the other waters at Salton Sea? According to Table 8-7 in the PEIR, four of the alternatives show a selenium hazard quotient of 0 for the brine sink; two alternatives show a selenium hazard quotient of 0.1 for the brine sink; only two alternatives shows a brine sink selenium hazard quotient of 0.2 or higher.

AQ-136 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Has the use of water efficient vegetation at the densities assumed for the PEIR and at the water application rates assumed for the PEIR been proven to provide the assumed 95% control of wind erosion? If so, where has this demonstration taken place? If not, then why did the PEIR considered this method to be proven when stabilization by brine application is not?

AQ-137 Appendix H-3, Pages H3-3 and H3-14; Attachment E6, Page E6-3, Table H6-1, Table H6-2. and Table E3-1
Stabilization with water-efficient vegetation generally would be considered to have an aesthetic advantage over other stabilization methods, and often would have some wildlife habitat value not generated by most other stabilization methods.

AQ-138 Appendix H-3, Page H3-5, Paragraph 6 (bullet item 2 under Playa with no specific land use)
The resistance of salt crust to wind erosion varies first and foremost according to the chemistry of the salt crust. Only those salts which undergo mineralogical phase changes are likely to show seasonal variations in susceptibility to wind erosion. Halite salt crusts are effective at protecting underlying sediments from wind erosion because they do not undergo mineralogical phase changes.

AQ-139 Appendix H-3, Page H3-5, Paragraph 11 (bullet item 1 under Refine understanding of playa emission patterns)
The PEIR failed to evaluate the hydrologic mechanisms and other conditions associated with the limited seasonal efflorescent deposits found along the southern shoreline of Salton Sea. This compromised the assessment of playa dynamics which must be considered to estimate probable conditions for the lakebed sediments that will be exposed by lowered Salton Sea water levels. If the existing shoreline efflorescent salt deposits are due to localized conditions, then it is inappropriate to assume that such conditions will automatically apply to future exposed sediment areas.

AQ-140 Appendix H-3, Page H3-6, Paragraph 5 (bullet item 2 under Develop dust control plans)
Because the water chemistry of Salton Sea is more similar to that of Great Salt Lake than it is to the groundwater underlying the Owens Lake playa, the literature and experiences of knowledgeable agencies in Utah should be evaluated to better characterize the potential for fugitive dust from lakebed sediments exposed at the Salton Sea and the effectiveness of halite salt crusts as a measure to control wind erosion from exposed sediments. (See supplemental table sheet, included at the end of these comments)

AQ-141 Appendix H-3, Page H3-6, Paragraph 10 (bullet item 2 under Plan for feedback)
Improved dust control mitigation measures need to be incorporated into the impact assessment and comparison of alternatives at the Final PEIR stage before selecting a restoration alternative.

AQ-142 Appendix H-3, Page H3-7, Paragraph 2 (Item 3)
Appendix H-3 notes that areas of the Owens Lake playa intermittently covered by the residual brine pool do not need any stabilization measures because they are either intermittently wet or are stabilized by a salt cap. Why does this not count as a demonstration of the mitigation effectiveness of stable salt crusts? The residual brine pool at Owens Lake is where most of the chloride salt precipitated when Owens Lake was desiccated. Why would not similar conditions prevail for areas around the brine sink under the various Salton Sea alternatives?

AQ-143 Appendix H-3, Page H3-8, Paragraph 4
Before applying the 30% non-emissive factor to exposed lakebed area, it is essential to separate out areas that would be protected by a non-emissive halite salt crust either formed deliberately in salt evaporation cells or formed by direct salt precipitation from a shrinking brine sink that has reached saturation.

AQ-144 Appendix H-3, Page H3-10, Paragraph 10 (bullet item 4 under Effective and reliable)
It does not take a formal research study to confirm the effectiveness of dust control measures. Simple practical experience is often enough. How many formal research studies have been conducted to prove that asphalt paving or concrete paving effectively control wind erosion from the paved area?

AQ-145 Appendix H-3, Page H3-16, Paragraphs 2 and 4
The text acknowledges that stable salt crusts are not susceptible to wind erosion, and provide virtually 100% control of wind erosion for underlying sediments. Halite is clearly a stable salt crust, and paragraph 4 acknowledges that sodium chloride is resistant to wind erosion. Why was this information not carried over into other portions of this appendix, the main PEIR text, and other appendices of the PEIR?

AQ-146 Appendix H-3, Page H3-16, Paragraph 5
BLM tested the durability of the natural salt crust at Bonneville Salt Flats by driving a tandem belly-dump-and-pup haul truck loaded with 33 tons of salt across a flooded and water-saturated section of the crust. No rutting and minimal salt compression occurred during the test. BLM cautions the public not to drive on the Salt Flats when they are flooded by winter rains. Stability of the salt crust is not at issue; but salt spray from the flooded Salt Flats can short out electrical components and disable vehicles. (See White and Wadsworth (2001) reference noted in Supplemental discussion for Comment 87)

AQ-147 Appendix H-3, Page H3-16, Paragraph 6
If brine from the brine sink of an alternative is used as the water source to establish a salt crust, inadvertent ponding will not lead to development of invertebrate populations and creation of an attraction for birds and mobilization of selenium into the avian food supply. The brine will be too saline to support an avian food web link.

AQ-148 Appendix H-3, Page H3-17, Paragraph 2

The text claims that "stabilization with brine has not been proven on a large scale under conditions similar to those at Salton Sea". If this comment is going to be made about stabilization with brine, then it must be made about every mitigation measure listed on Tables H3-1 and H3-2, including stabilization with water efficient vegetation.

AQ-149 Appendix H-3, Page H3-17, Paragraphs 6 and 7
The dominant motion process for blowing sand is particle creep and saltation, not suspension transport which is the movement process of concern with respect to fugitive dust. Particle creep and particle saltation occur at lower threshold wind velocities than particle suspension in wind erosion. What percent vegetation cover is required for effective control of fugitive dust generation by wind erosion? The DRI study did not observe blowing sand at the study sample sites, and noted that blowing sand is not necessary for dust storm development. Blowing sand is common at Owens Lake, but not at Salton Sea.

AQ-150 Appendix H-3, Page H3-23, Paragraphs 4 and 6
There is no evidence that windblown sand drives wind erosion processes at Salton Sea. The DRI study concluded that blowing sand was not a major factor at the study sites tested with portable wind tunnels or PI-SWERL equipment.

AQ-151 Appendix H-3, Page H3-24, Paragraph 6
Although cost and environmental impact argue against large-scale use of gravel cover as a fugitive dust mitigation measure, the 2003 Owens Valley PM_{10} SIP states that it has proven to be an effective long-term measure with no deterioration in effectiveness over a 17-year period.

AQ-152 Appendix H-3, Page H3-26, Paragraph 1
There is no evidence that windblown sand drives wind erosion processes at Salton Sea. The DRI study concluded that blowing sand was not a major factor at the study sites tested with portable wind tunnels or PI-SWERL equipment.

AQ-153 Appendix H-3, Page H3-27, Paragraph 8
Creation of a halite salt crust (the key element of stabilization with brine) has been proven effective at extremely large scales and for extremely long time frames as both natural and artificially created salt crusts. The salt deposits on extensive playa areas left by Pleistocene Lake Bonneville in western Utah are a natural experiment in halite salt crust effectiveness and durability. They have existed for centuries, if not millennia, and cover well over 1 million acres. The West Desert Pumping Project left a 325,000 acre man-made halite salt crust that is still present 17 years later. (See Great Salt Lake Desert sheet for satellite image, included in Exhibit X)

AQ-154 Appendix H-3, Page H3-27, Paragraph 8
Because it does not require the use of scarce fresh water, stabilization with brine is the most water-efficient dust control measure. Stabilization with brine makes use of the readily available brine sink waters common to all alternatives.

AQ-155 Appendix H-3, Page H3-27, Paragraph 9
Because blowing sand is not a demonstrated element in wind erosion processes at Salton Sea, sand fences will not be effective in most areas. They would be useful only in limited situations where there is an actual source of blowing sand.

AQ-156 Appendix H-3, Page H3-28, Paragraph 3
Creation of a halite salt crust from Salton Sea water has already been tested and demonstrated at the Agrarian Research Pilot Study site. That study was completed in 2003, but the resulting salt cap was not investigated in the DRI study and is not even mentioned in the PEIR.

AQ-157 Appendix H-3, Page H3-33, Paragraph 5 and Table H3-3

This is the first reference in the PEIR to the assumed vegetation cover for the water efficient vegetation dust control measure. Has this planting density and the resulting 22% ground cover factor) been tested for dust control effectiveness at Owens Lake or elsewhere? If so, did it achieve the assumed 95% control effectiveness under all wind speeds?

AQ-158 Appendix H-3, Page H3-39, Paragraph 1
The text statement that "this measure does not meet performance criteria established for the alternatives" must be substantiated by clear evidence that the measure's performance has been thoroughly investigated. Do agencies with direct knowledge of halite salt crust dynamics concur that stabilization with brine has not been proven to be effective (*see Comments 30 and 31*)? Has the PEIR team evaluated the effectiveness of the salt cap produced at the Agrarian Research pilot project site?

AQ-159 Appendix H-3, Page H3-39, Paragraph 2
The comparison of Salton Sea conditions to "meteorological triggers" at Owens Lake is only relevant where the expected salt chemistry at Salton Sea will be similar to that at Owens Lake. The meteorological triggers at Owens Lake are irrelevant to halite salt crusts. The Agrarian Research pilot project site is a true test of these meteorological triggers at Salton Sea, and there is no evidence that the PEIR evaluated the performance of this salt cap. Based on water chemistry, the seasonal thin efflorescent salt crusts along the southern shoreline of Salton Sea are an anomaly, and are not representative of the crusts that would be deposited by saturated brine in the brine sink areas. The Agrarian Research pilot study site is much more relevant to the expected composition and stability of crusts that would form around the brine sink features of the various alternatives.

AQ-160 Appendix H-3, Page H3-39, Paragraph 4
According to Table 3-3 in the PEIR text, brine sink salinity will exceed 200,000 mg/L in Phase 2 for all alternatives, and would exceed 300,000 mg/L (approaching or perhaps be at saturation) under Alternatives 3, 5, 6, 7, and 8. Based on both Appendix B of Attachment E9 and the practical experience at the Agrarian Research pilot project site, a stable halite salt crust would be expected under these alternatives as the level of the brine sink recedes further.

AQ-161 Appendix H-3, Page H3-51, Paragraph 2
Sprinkler application of brine would encounter a host of problems, including equipment clogging and fouling and serious salt spray drift issues. Depending on location, salt spray drift may or may not be a serious problem for adjacent areas. The enhanced evaporation system test program conducted by the Bureau of Reclamation and Salton Sea Authority at the Navy Test Base site provides a practical lesson in the difficulties encountered when trying to operate spray equipment with Salton Sea water. While fouling and clogging of water intake systems had solutions, mist fouling of spray equipment systems was a major problem with no readily apparent solution other than frequent equipment maintenance operations. Simple surface irrigation methods may be more practical than spray application methods.

AQ-162 Appendix H-3, Page H3-56, Paragraph 8 (bullet item 2)
The DRI study noted that blowing sand is generally not an issue at Salton Sea. Consequently, sand motion monitoring stations may not be necessary unless blowing sand is verified by other monitoring.

Supplemental Tables

ABSOLUTE CONCENTATIONS AND MOLAR RATIOS OF MAJOR SALT ANIONS IN OWENS LAKE, MONO LAKE, GREAT SALT LAKE, OCEAN WATER, AND SALTON SEA PEIR APPENDIX E9 DATA FOR SALTON SEA

ANION CONSTITUENT	SUM OF ATOMIC WEIGHTS	WATER CONCENTRATION, gm/kg				
		HISTORIC OWENS LAKE	MONO LAKE	GREAT SALT LAKE	OCEAN WATER	SALTON SEA
Chloride	35.453	28.6	23.0	123.0	19.0	17.2
Sulfate	96.0626	13.1	13.1	17.0	2.6	8.6
Carbonate	60.0089	25.0	23.6	1.1		
Bicarbonate	61.01684				0.14	0.191
SUM		66.8	59.7	141.2	21.8	26.05
Cl : SO4 ratio		2.2	1.8	7.2	7.2	2.0
Cl : CO3 ratio		1.1	1.0	110.2	0.0	0.0
Cl : HCO3 ratio		0.0	0.0	0.0	135.6	90.2
Cl : SO4+H/CO3 ratio		**0.8**	**0.6**	**6.8**	**6.8**	**2.0**

ANION CONSTITUENT	SUM OF ATOMIC WEIGHTS	MOLAR EQUIVALENTS				
		HISTORIC OWENS LAKE	MONO LAKE	GREAT SALT LAKE	OCEAN WATER	SALTON SEA

Chloride	35.453	0.8081	0.6487	3.4703	0.5354	0.4859
Sulfate	96.0626	0.1364	0.1364	0.1773	0.0276	0.0899
Carbonate	60.0089	0.4169	0.3933	0.0186		
Bicarbonate	61.01684				0.0023	0.0031
SUM		1.3613	1.1784	3.6662	0.5652	0.5790
Cl : SO4 ratio		5.9	4.8	19.6	19.4	5.4
Cl : CO3 ratio		1.9	1.6	186.5	0.0	0.0
Cl : HCO3 ratio		0.0	0.0	0.0	233.3	155.2
Cl : SO4+H/CO3 ratio		**1.5**	**1.2**	**17.7**	**17.9**	**5.2**

		RELATIVE MOLAR PERCENTS				
ANION CONSTITUENT	SUM OF ATOMIC WEIGHTS	HISTORIC OWENS LAKE	MONO LAKE	GREAT SALT LAKE	OCEAN WATER	SALTON SEA
Chloride	35.453	59.36%	55.05%	94.66%	94.72%	83.93%
Sulfate	96.0626	10.02%	11.57%	4.84%	4.88%	15.53%
Carbonate	60.0089	30.62%	33.37%	0.51%		
Bicarbonate	61.01684				0.41%	0.54%
SUM		100.00%	100.00%	100.00%	100.00%	100.00%
Cl : SO4 ratio						
Cl : CO3 ratio						

Cl : HCO3 ratio	
Cl : SO4+H/CO3 ratio	

Data Sources:

Owens Lake water quality prior to 1912 from Table 6 in Saint-Amand et al, 1986 (mean of 6 analyses, 1866 - 1905).

Mono Lake water quality data from Table 3B-2 in Mono Basin Draft EIR, 1993.

Great Salt Lake water quality data from Table 3 in Whelan and Petersen, 1975, Utah Geological and Mineral Survey Water-Resources Bulletin 20; average of data for 1966, 1972, and 1973; bicarbonate as carbonate weight percent for 1930 assumed for all years.

Ocean water quality data from Indiana University G131 Course Notes (2005) (www.indiana.edu/~g131/chem.html).

Salton Sea water quality data from Table E9-2, Appendix E9 of PEIR.

Salt Saturation Curve

Extracted from: Saint-Amand, Pierre, Larry A. Matthews, Camille Gaines, and Roger Reinking. 1986. Dust Storms From Owens and Mono Valleys, California. NWC TP 6731. Naval Weapons Center, China Lake, CA.

NWC TP 6731

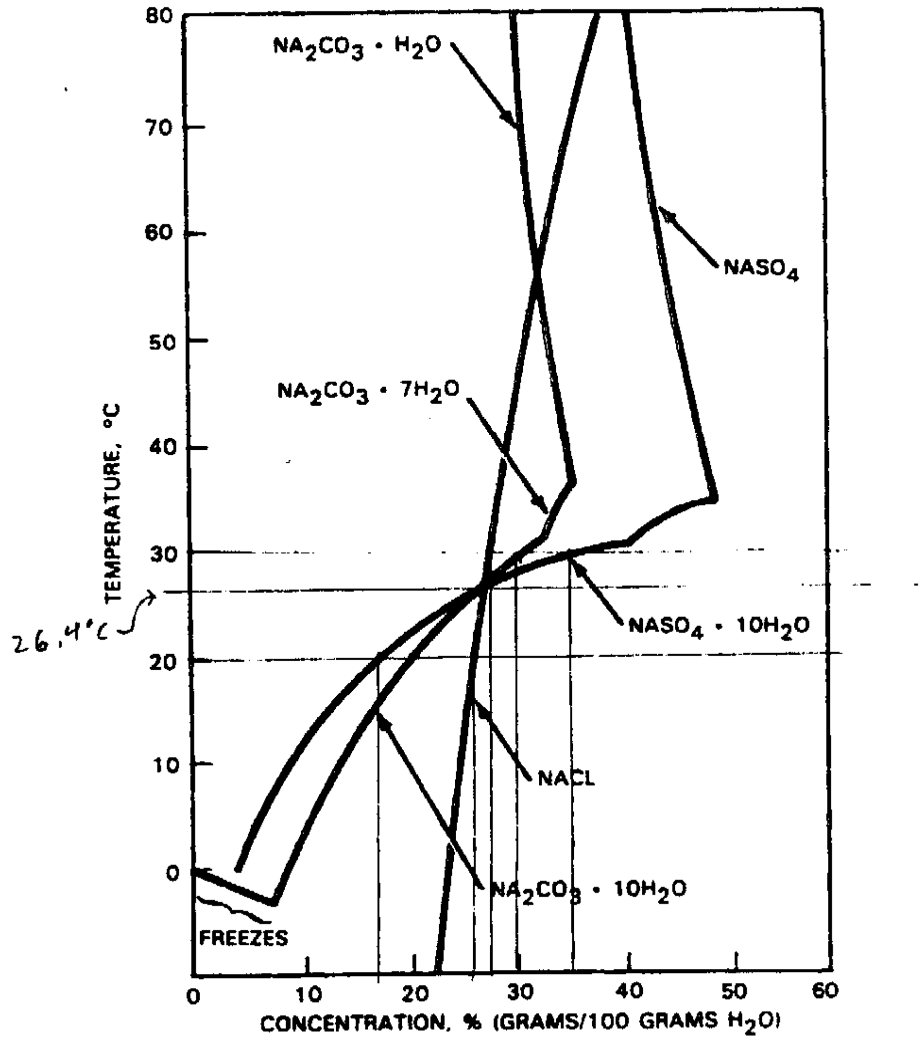


FIGURE 37. Concentration as a Function of Temperatures at Which the Compounds Precipitate From Solution.